FINAL REPORT

ASHLAND HIGHWAY EMERGENCY PROJECT
ROSEBUD COUNTY, MONTANA

MT AMRB-90-01

APRIL 6, 1990

Prepared for: MR. JOHN KOERTH
Reclamation Specialist
Abandoned Mine Reclamation Bureau
Montana Department of State Lands
1625 Eleventh Avenue
Helena, Montana 59620

Prepared by: SPECTRUM ENGINEERING
Mining & Civil Engineers
3302 Fourth Avenue North
Billings, Montana 59101

WILLIAM C.
MAEHL
5274 E

William C Maehl

William C. Maehl, P.E.
Project Engineer

William C. Maehl
Project Inspector

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ASHLAND HIGHWAY EMERGENCY PROJECT
FINAL REPORT

I. INTRODUCTION

A. Project Objectives

The Ashland Highway OSM Emergency Project reclamation work was undertaken to backfill subsidence and underground coal mine voids underneath State Highway 212 just west of Ashland. After completion of drilling and grouting, all disturbed areas will be seeded. The completion of the reclamation work will stabilize the paved State Highway.

B. Site Description and Location

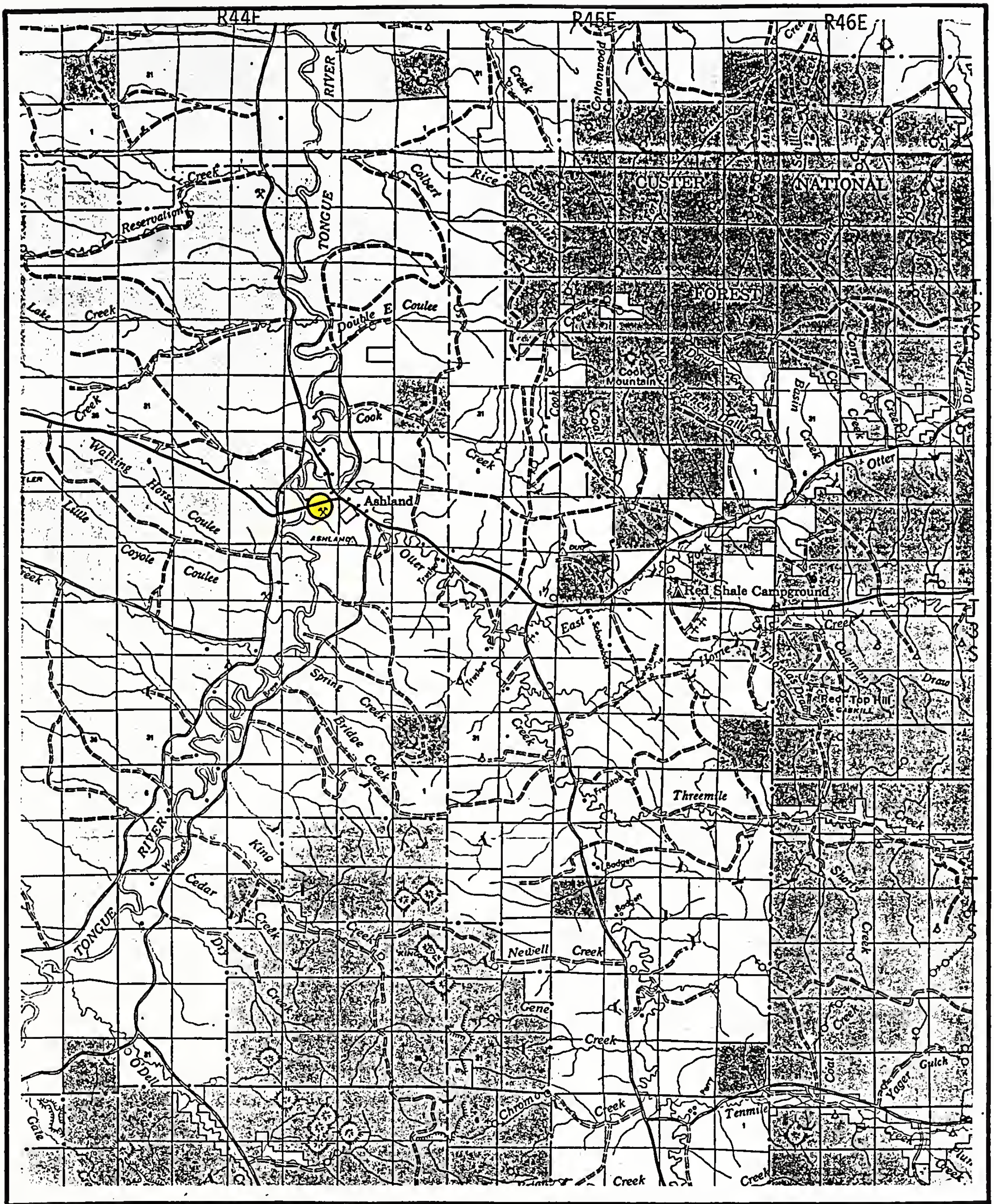
The Ashland Highway Emergency Project is located on the far eastern edge of Rosebud County between the Tongue River and the town of Ashland straddling U.S. Highway 212. The average elevation is 2940 feet.

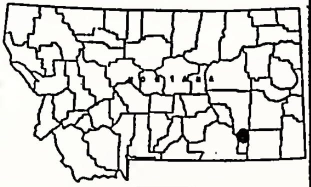
The legal description is the NW¼ SW¼ NE¼ of Section 10, Township 3 South, Range 44 East, Rosebud County, Montana as shown on the Site and Vicinity Maps. The latitude is 45°35.6′ and the longitude is 106°17.0′. The site is located on the Ashland 7 1/2 minute USGS quadrangle.

C. Land Ownership and Access

The Ashland Highway Emergency Project site is owned by the State of Montana, Department of Highways. They acquired right-of-way in Section 10 from the Greens on April 17, 1944 (Book 43, Page 32, Rosebud County courthouse). Bruce Russell is the District Engineer and Vic Scheuffele is the District Utility Agent for the Montana Highway Department located in Glendive. Their address is 503 North River Avenue, P.O. Box 890, Glendive, Montana 59330, phone 406/365-5296 and fax 406/365-8160.

To reach the site you proceed east out of Billings on I90 until you reach the Custer Battlefield (Highway 212) off ramp. From there proceed until you can see Ashland. The site is between the Tongue River and Ashland. It is 126 miles from Billings to the project site.





STATE OF MONTANA — DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU—RECLAMATION DIVISION

VICINITY MAP

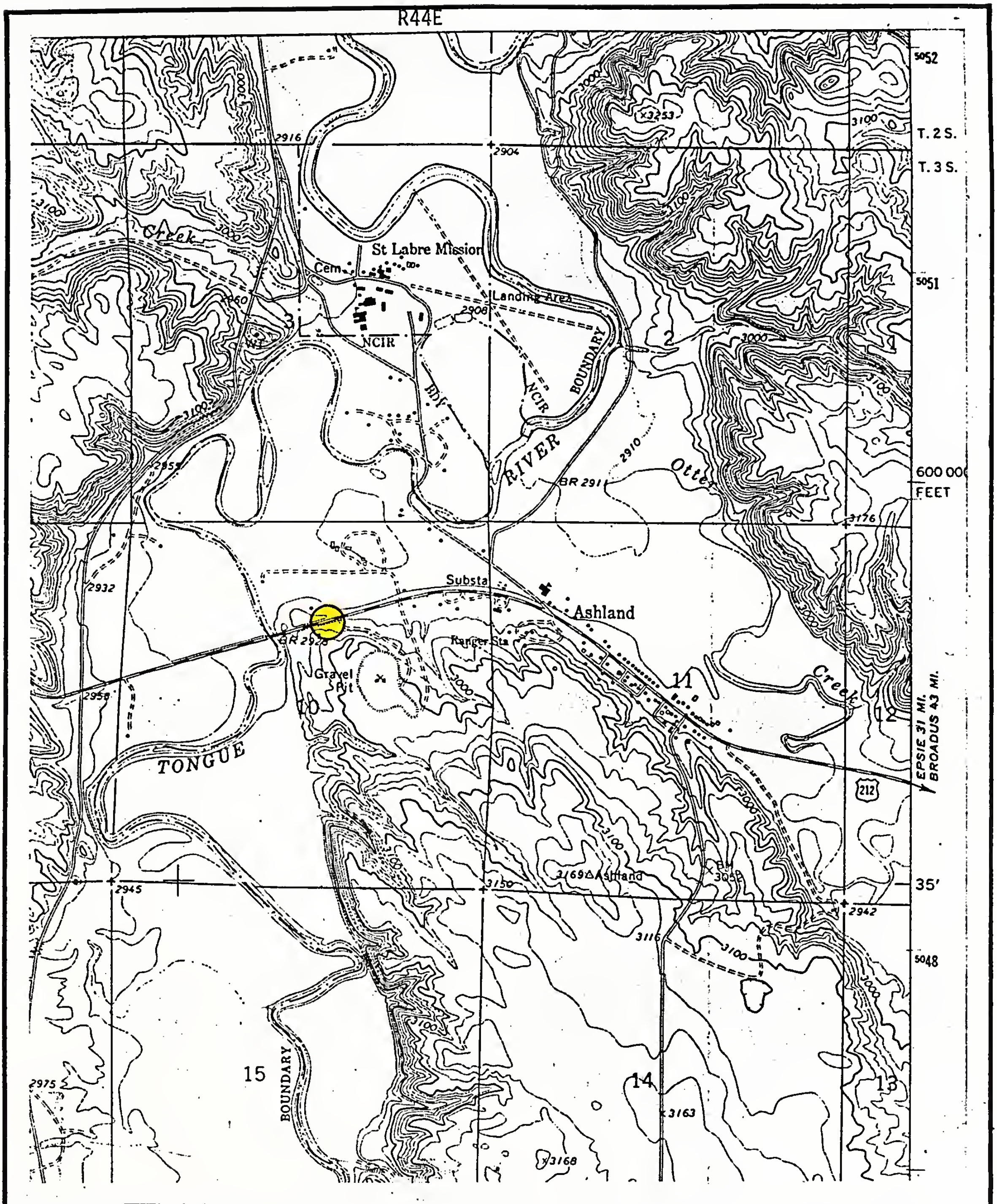
N

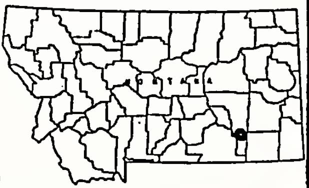
SITE ASHLAND HIGHWAY (BENJAMIN HOLT MINE)

ROSEBUD COUNTY, MT; TOWNSHIP 3 S RANGE 44 E

SECTION(S) 10

MAP SCALE: 1" = 2.5 miles





STATE OF MONTANA — DEPARTMENT OF STATE LANDS

ABANDONED MINE RECLAMATION BUREAU—RECLAMATION DIVISION

SITE MAP

SITE ASHLAND HIGHWAY (BENJAMIN HOLT MINE)

ROSEBUD COUNTY, MT; TOWNSHIP 3 S RANGE 44 E

SECTION(S) 10

MAP SCALE: 1"= 2000 U.S.G.S. QUAD SHEET ASHLAND

D. History

Benjamin Holt leased this mine from the USA Department of the Interior on June 25, 1927. This lease was for forty acres located in the SW¼NE¼ Section 10, T3S, R44E, Rosebud County, Montana. He produced 2277 tons from this lease prior to abandonment on July 10, 1940. The underground coal mine adit in question was worked from 1923 in trespass until 1929 when it was abandoned due to an inability to hold the roof (mine inspectors report). There were about 600 feet of workings by that date. An underground mine map dated May 16, 1928 drawn by the mine inspector is available.

The State of Montana, Department of Highways acquired right-of-way in Section 10 from the Greens on April 17, 1944. Project FAP 334 paved the then gravel road running east-west through Ashland. The Highway number is 212. The Department of Highways plan and profile sheet for the area of concern shows where the highway went over the top of the abandoned coal mine.

Susan McAnally of the AMR Bureau, Department of State Lands in Helena received a phone call on 1/10/1990 3:30 P.M. MST from Jack Liedle, Geologist, State Highway Department, Billings, Montana. Mr. Liedle stated that there was a hole alongside Highway 212 just west of Ashland. The Highway Department had augered 5 drill holes on December 19th and 20th, 1989 just off the pavement. Hole 3 and 4 (12 feet apart) hit an eight foot void, 12 feet under the surface. Hole 2 hit some water and possibly 1 foot of void. He wanted to know if the DSL could help with the problem.

At 10 A.M. on 1/11/1990 John Koerth, AMR Bureau contacted Spectrum Engineering (one of their engineering representatives) to investigate the problem. Spectrum spent the remainder of the day gathering historical information and further information from the Highway Department. By late afternoon it became apparent that State Highway 212 may be undermined and possibly an emergency situation.

Spectrum Engineering's Bill Maehl and Jim Johnson (both registered professional mining engineers) conducted a field visit of the site on 1/12/1990. They located the original mine entrance (now collapsed) on the north side of the highway. The five Highway Department drill holes were also located within four feet of the pavement on the south side of the highway. Also a subsidence hole adjacent to drill hole one was located in the burrow ditch. A plane table and alidade map was prepared of the area.

Spectrum then went to the Ashland Highway Department (phone 406-784-2224) and talked to Don May. He indicated that the subsidence hole found next to drill hole one opened up about 30 years ago and two guys went down into the mine. The hole was filled and stayed filled for about 10 to 15 years. Since then each year it continues to subside up to 8 feet deep and he refills it each year. He said the highway itself has subsided several times and the blacktop has had to be resurfaced.

D. History (Cont.)

He suggested that John Wilbur, a retired State Highway employee be contacted. Spectrum went to his house (located on the north side of the main street of Ashland, green chain link fence, phone 406-784-2588). Mr. Wilbur said that he and another man were parked along the highway in 1960 or 1962 eating lunch when a loud explosion occurred and a hugh cloud of black dust came up in front of them. They immediately drove off thinking they were being bombed and were under attack.

Upon returning to the area, they discovered a large subsidence hole going into the old mine workings. The two men who did go down the hole are now dead. Mr. Wilbur didn't go down but said he could see the adit running under the highway and back under the hillside to the south. Both were wide open and the timbers were in good shape.

Based on the 1928 underground mine map, the interview with John Wilbur, the old adit entrance in relationship to the subsidence hole and the drill hole information from the State Highway Department there is no doubt that State Highway 212 was undermined. The main adit was 5 to 6 feet high and 6 to 12 feet wide with only 12 feet of cover to the blacktop highway surface.

Andy Anderson, the Engineering Services Supervisor for the Highway Department out of Glendive gave Spectrum traffic counts. For 1988 he said that the total traffic count both directions averaged 1400 vehicles per day. He said they normally leave their counter out for one week. Their projection is 1570 vehicles per day in 1993 and 2050 vehicles per day in 2013. Current plans call for road bank widening and new blacktop overlay in the year 1993.

Upon project completion the actual underground voids did not even closely match the old underground map. There this map has not been included herein.

II. DESCRIPTION OF RECLAMATION PROJECT

A. Site Hazards and Problems

The site is located on both sides of the U.S. Highway 212. The area on the north side of the highway consists of a collapsed adit which will not require action. The south side of the highway had one 5 foot deep subsidence hole. The extent of the voids under the highway and the borrow ditches were unknown at the beginning of the project.

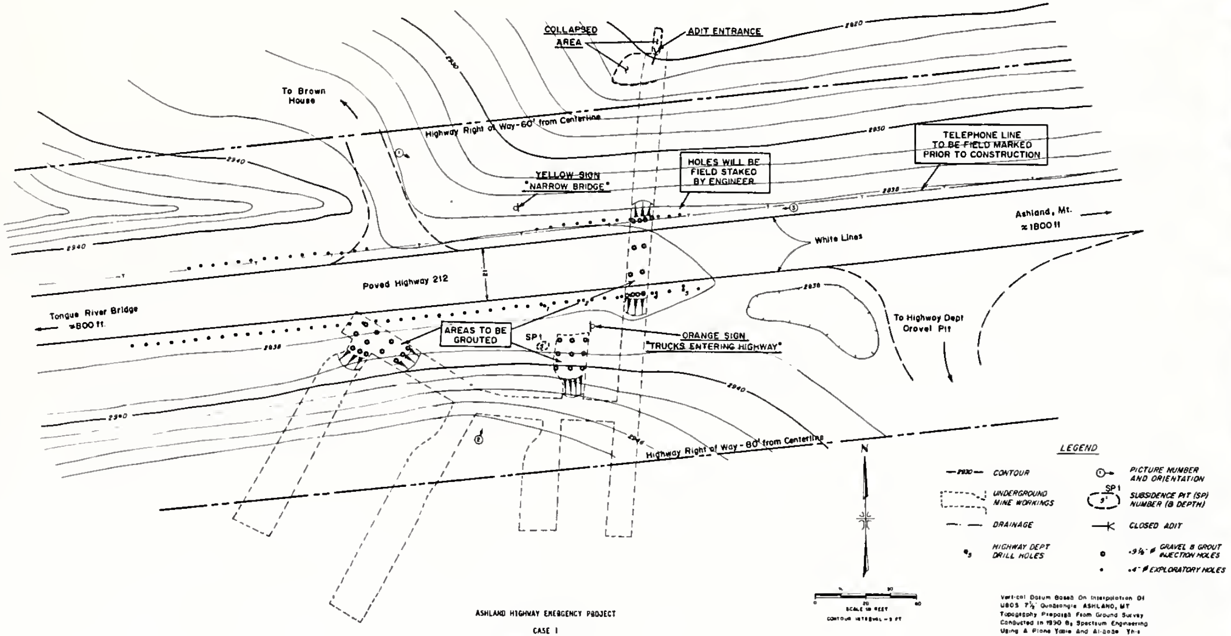
B. Project Planning

The scope of work was to eliminate the danger of subsidence of Highway 212.

John Koerth was the AMR Bureau representative. Bill Maehl and Don Sutton were the project engineers and Bill Maehl was the construction inspector for Spectrum Engineering.

The three site plans showing the potential underground voids are presented on the following pages. These plans were based on the 1929 underground map with different orientations. Three cases were presented in the bid package. The bids were based on the least amount of work (case 1). The rationale behind this being the contractor probably would not complain if the work increased. However, if the worst case had been bid and little or no voids were found the work would go from $114,000 to $25,000 and the contractor would want more money.

The as built site plan is also presented since the actual field conditions encountered did not match the underground map.


COLLAPSED AREA
ADIT ENTRANCE
To Brown House
Highway Right of Way-60' from Centerline
YELLOW SIGN "NARROW BRIDGE"
HOLES WILL BE FIELD STAKED BY ENGINEER
TELEPHONE LINE TO BE FIELD MARKED PRIOR TO CONSTRUCTION
Ashland, Mt. ≈1800 ft
White Lines
Paved Highway 212
Tongue River Bridge ≈800 ft.
AREAS TO BE GROUTED
SP1
ORANGE SIGN "TRUCKS ENTERING HIGHWAY"
To Highway Dept Gravel Pit
Highway Right of Way-80' from Centerline
2920
2930
2940
2938
2936
N
SCALE IN FEET
CONTOUR INTERVAL = 2 FT
LEGEND
CONTOUR
UNDERGROUND MINE WORKINGS
DRAINAGE
HIGHWAY DEPT DRILL HOLES
PICTURE NUMBER AND ORIENTATION
SUBSIDENCE PIT (SP) NUMBER (& DEPTH)
CLOSED ADIT
9⅞" ⌀ GRAVEL & GROUT INJECTION HOLES
4" ⌀ EXPLORATORY HOLES

Vertical Datum Based On Interpolation Of USGS 7½' Quadrangle ASHLAND, MT
Topography Prepared From Ground Survey Conducted in 1990 By Spectrum Engineering Using A Plane Table And Alidade. This Topography Is Of Reconnaissance Class And Has Not Been Field Checked

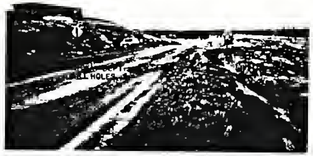
ASHLAND HIGHWAY EMERGENCY PROJECT

CASE I
LEAST WORK CASE
WORK SUMMARY TABLE

ITEM No.	ESTIMATED QUANTITY	UNIT	ITEM	DESCRIPTION	
1.	1	LUMP SUM	Mobilization		
2.	1	LUMP SUM	Traffic Control		
3.	1,500	FEET	Drill Test Holes - 4" Diameter	75 Holes	20 ft deep
4.	120	FEET	Ream Test Holes to 9-7/8" Dia	10 Holes	12 ft deep
5.	420	FEET	Drill 9-7/8" Diameter Holes	35 Holes	12 ft deep
6.	140	FEET	8" ID Plastic Casing	10 Lengths	14 ft long
7.	275	LCY	Place Gravel Down Hole		
8.	25	LCY	Place Gravity Grout		
9.	75	EACH	Backfill & Reclaim 4" Holes	75 Holes	
POSSIBLE ADDITIONAL WORK (NO WORK-NO PAYMENT IF ITEMS 10-14 ARE NOT NEEDED)					
10.	1	LUMP SUM	Mobilize Trenching Equipment		
11.	1	LUMP SUM	Trenching Traffic Control		
12.	1	LUMP SUM	Salvage & Replace Topsoil	45 lcy	
13.	1	LUMP SUM	Mine Timber Debris Removal		
14.	250	BCY	Excavate and Backfill Trench		

① PICTURE 1 IS LOOKING SOUTHEAST TOWARD ASHLAND SHOWING THE HIGHWAY BORROW PIT ON THE NORTH SIDE.

② PICTURE 2 IS LOOKING NORTHEAST AT THE 5 HIGHWAY DEPARTMENT DRILL HOLES ON THE SOUTH SIDE OF THE ROAD



③ PICTURE 3 IS LOOKING WEST TOWARD THE TONGUE RIVER. THE BORROW DITCH ON BOTH SIDES OF THE HIGHWAY CAN BE SEEN

LANDOWNER

STATE OF MONTANA
DEPARTMENT OF HIGHWAYS
% BRUCE RUSSELL
P.O. BOX 890
GLENDIVE, MT. 59330
PHONE (406) 365-5296

NOTICE

AN ABANDONED COAL MINE UNDERLIES THIS SITE MANY POTENTIAL HAZARDS EXIST THE EXTENT OF THESE HAZARDS IS NOT FULLY KNOWN CONTRACTORS AND OTHER PERSONS WORKING AT THE SITE SHALL APPRISE THEMSELVES OF THE CONDITIONS AND TAKE WHATEVER STEPS ARE DEEMED NECESSARY TO INSURE SAFETY WHILE PERFORMING THEIR DUTIES

CASE I

SITE PLAN AND GENERAL LAYOUT

ASHLAND HIGHWAY
(BENJAMIN HOLT MINE)
SECTION 10, T3S, R44E
ROSEBUD COUNTY, MONTANA

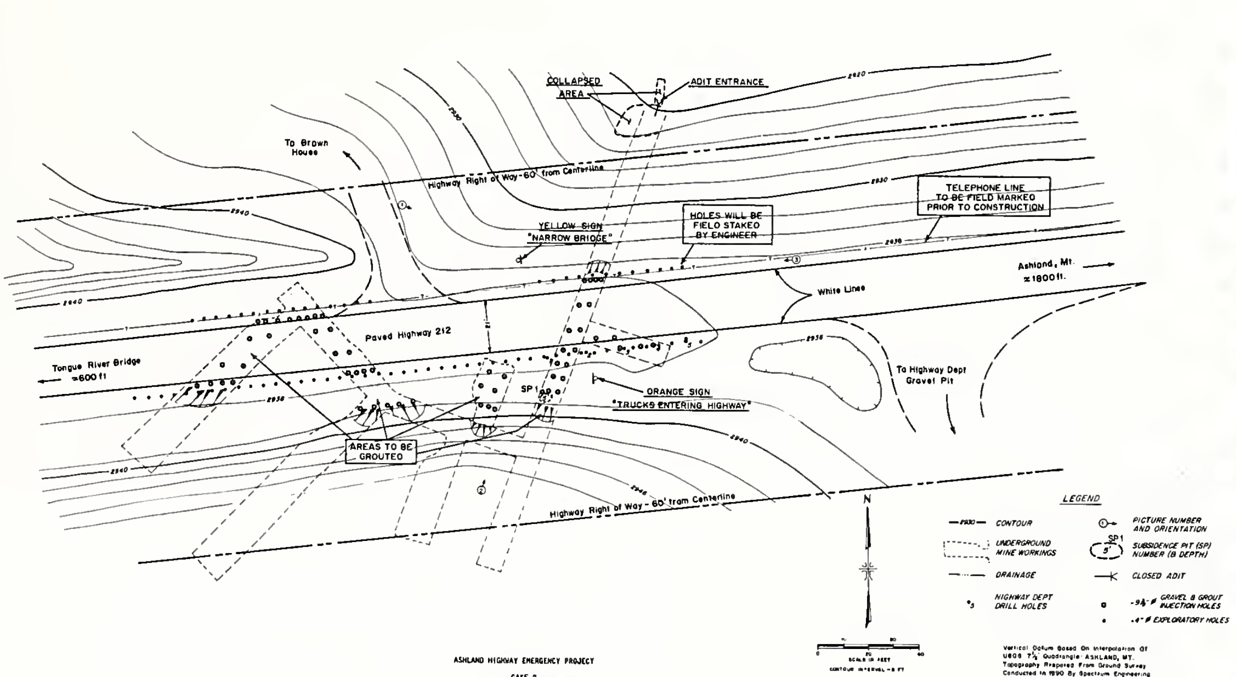
STATE OF MONTANA
DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION

SPECTRUM ENGINEERING
Mining and Civil Engineers
3302 4th AVE NORTH
BILLINGS, MONTANA

DATE January 25, 1990
DRAWN BY: OLO
APPROVED BY

REVISIONS NO	DATE	BY
1	2/13/90	LNR

SHEET NO 1 of 3


COLLAPSED AREA
ADIT ENTRANCE
To Brown House
Highway Right of Way-60' from Centerline
2920
2930
2940
TELEPHONE LINE TO BE FIELD MARKED PRIOR TO CONSTRUCTION
HOLES WILL BE FIELD STAKED BY ENGINEER
YELLOW SIGN "NARROW BRIDGE"
Ashland, Mt. ≈1800 ft.
White Lines
Paved Highway 212
Tongue River Bridge ≈600 ft
2938
SP1
ORANGE SIGN "TRUCKS ENTERING HIGHWAY"
AREAS TO BE GROUTED
To Highway Dept Gravel Pit
2936
Highway Right of Way - 60' from Centerline
N
0
20
40
80
SCALE IN FEET
CONTOUR INTERVAL = 2 FT
LEGEND
CONTOUR
UNDERGROUND MINE WORKINGS
DRAINAGE
HIGHWAY DEPT DRILL HOLES
PICTURE NUMBER AND ORIENTATION
SUBSIDENCE PIT (SP) NUMBER (& DEPTH)
CLOSED ADIT
-9⅞"⌀ GRAVEL & GROUT INJECTION HOLES
-4"⌀ EXPLORATORY HOLES

Vertical Datum Based On Interpolation Of USGS 7½' Quadrangle: ASHLAND, MT. Topography Prepared From Ground Survey Conducted In 1990 By Spectrum Engineering Using A Plane Table And Alidade. This Topography Is Of Reconnaissance Class And Has Not Been Field Checked

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② PICTURE 2 IS LOOKING NORTHEAST AT THE 5 HIGHWAY DEPARTMENT DRILL HOLES ON THE SOUTH SIDE OF THE ROAD.

③ PICTURE 3 IS LOOKING WEST TOWARD THE TONGUE RIVER. THE BORROW DITCH ON BOTH SIDES OF THE HIGHWAY CAN BE SEEN

ASHLAND HIGHWAY EMERGENCY PROJECT

CASE 2
MODERATE WORK CASE
WORK SUMMARY TABLE

ITEM No.	ESTIMATED QUANTITY	UNIT	ITEM	DESCRIPTION	
1.	1	LUMP SUM	Mobilization		
2.	1	LUMP SUM	Traffic Control		
3.	1,420	FEET	Drill Test Holes - 4" Diameter	81 Holes	20 ft deep
4.	180	FEET	Ream Test Holes to 9-7/8" Dia	15 Holes	12 ft deep
5.	720	FEET	Drill 9-7/8" Diameter Holes	60 Holes	12 ft deep
6.	140	FEET	8" ID Plastic Casing	10 Lengths	14 ft long
7.	400	LCY	Place Gravel Down Hole		
8.	200	LCY	Place Gravity Grout		
9.	81	EACH	Backfill & Reclaim 4" Holes	81 Holes	
POSSIBLE ADDITIONAL WORK (NO WORK-NO PAYMENT IF ITEMS 10-14 ARE NOT NEEDED)					
10.	1	LUMP SUM	Mobilize Trenching Equipment		
11.	1	LUMP SUM	Trenching Traffic Control		
12.	1	LUMP SUM	Salvage & Replace Topsoil	140 lcy	
13.	1	LUMP SUM	Mine Timber Debris Removal		
14.	750	BCY	Excavate and Backfill Trench		

LANDOWNER

STATE OF MONTANA
DEPARTMENT OF HIGHWAYS
℅ BRUCE RUSSELL
P.O. BOX 890
GLENDIVE, MT. 59330
PHONE (406) 365-5296

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CASE 2

SITE PLAN AND GENERAL LAYOUT

ASHLAND HIGHWAY
(BENJAMIN HOLT MINE)
SECTION 10, T3S, R44E
ROSEBUD COUNTY, MONTANA

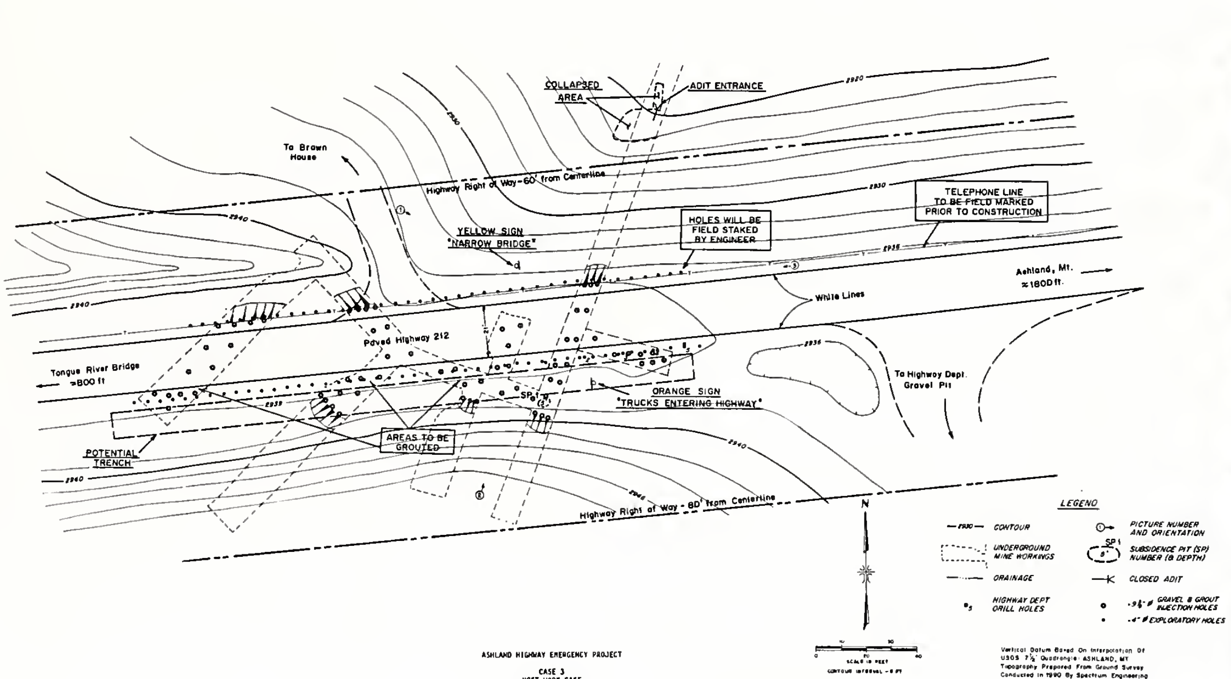
STATE OF MONTANA
DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION

SPECTRUM ENGINEERING
Mining and Civil Engineers
9302 4th AVE NORTH
BILLINGS, MONTANA

DATE January 25, 1990
DRAWN BY: DLD
APPROVED BY

REVISIONS NO	DATE	BY
1	2/13/90	LMR

SHEET NO 2 of 3


COLLAPSED AREA
ADIT ENTRANCE
2920
2930
2935
2936
2939
2940
To Brown House
Highway Right of Way - 60' from Centerline
①
YELLOW SIGN
"NARROW BRIDGE"
d
HOLES WILL BE FIELD STAKED BY ENGINEER
TELEPHONE LINE TO BE FIELD MARKED PRIOR TO CONSTRUCTION
③
Ashland, Mt.
≈1800 ft.
White Lines
Paved Highway 212
Tongue River Bridge
≈800 ft
To Highway Dept. Gravel Pit
SP 1
②
b
ORANGE SIGN
"TRUCKS ENTERING HIGHWAY"
POTENTIAL TRENCH
AREAS TO BE GROUTED
Highway Right of Way - 80' from Centerline
N
SCALE IN FEET
CONTOUR INTERVAL - 5 FT
LEGEND
2930 CONTOUR
UNDERGROUND MINE WORKINGS
DRAINAGE
HIGHWAY DEPT DRILL HOLES
PICTURE NUMBER AND ORIENTATION
SUBSIDENCE PIT (SP) NUMBER (& DEPTH)
CLOSED ADIT
9⅞" ⌀ GRAVEL & GROUT INJECTION HOLES
4" ⌀ EXPLORATORY HOLES

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ASHLAND HIGHWAY EMERGENCY PROJECT

CASE 3
MOST WORK CASE
WORK SUMMARY TABLE

ITEM No.	ESTIMATED QUANTITY	UNIT	ITEM	DESCRIPTION	
1.	1	LUMP SUM	Mobilization		
2.	1	LUMP SUM	Traffic Control		
3.	2,000	FEET	Drill Test Holes - 4" Diameter	100 Holes	20 ft deep
4.	240	FEET	Ream Test Holes to 9-7/8" Dia	20 Holes	12 ft deep
5.	840	FEET	Drill 9-7/8" Diameter Holes	70 Holes	12 ft deep
6.	140	FEET	6" ID Plastic Casing	10 Lengths	14 ft long
7.	600	LCY	Place Gravel Down Hole		
8.	300	LCY	Place Gravity Grout		
9.	100	EACH	Backfill & Reclaim 4" Holes	100 Holes	
POSSIBLE ADDITIONAL WORK (NO WORK-NO PAYMENT IF ITEMS 10-14 ARE NOT NEEDED)					
10.	1	LUMP SUM	Mobilize Trenching Equipment		
11.	1	LUMP SUM	Trenching Traffic Control		
12.	1	LUMP SUM	Salvage & Replace Topsoil	140 lcy	
13.	1	LUMP SUM	Mine Timber Debris Removal		
14.	850	BCY	Excavate and Backfill Trench		

LANDOWNER

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DEPARTMENT OF HIGHWAYS
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CASE 3

SITE PLAN AND GENERAL LAYOUT

ASHLAND HIGHWAY
(BENJAMIN HOLT MINE)
SECTION 10, T3S, R44E
ROSEBUD COUNTY, MONTANA

STATE OF MONTANA
DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU. RECLAMATION DIVISION

SPECTRUM ENGINEERING
Mining and Civil Engineers
3302 4th AVE NORTH
BILLINGS, MONTANA

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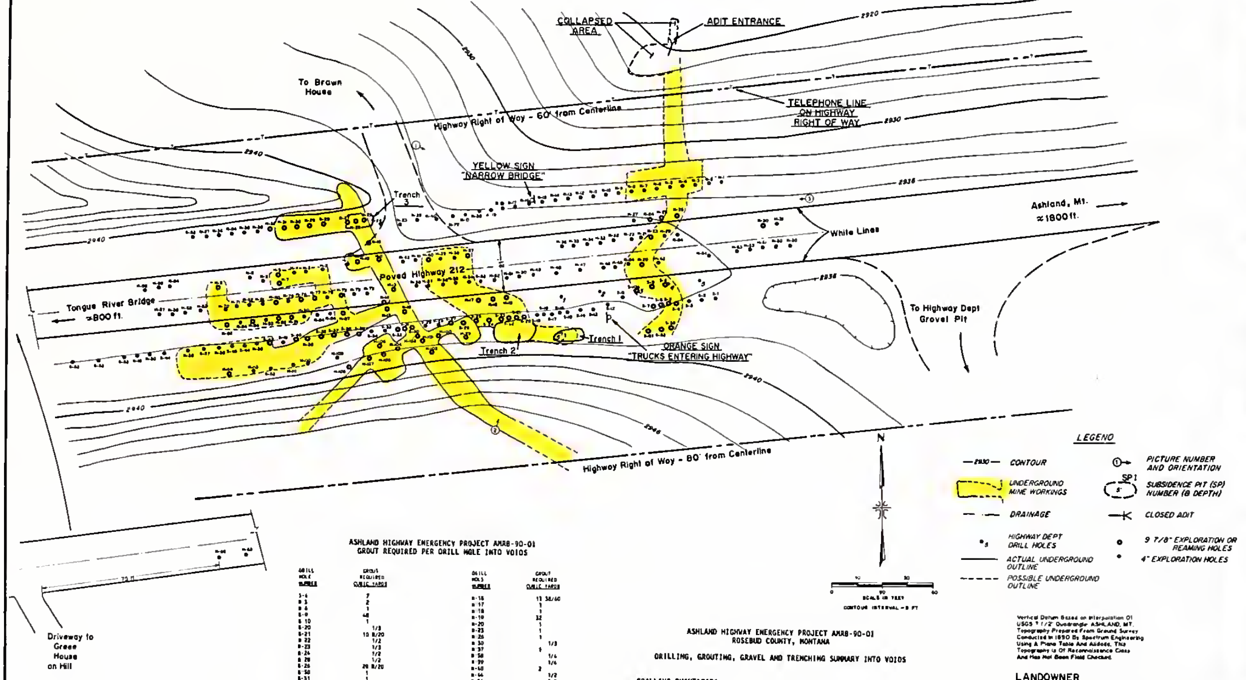
SHEET NO 3 of 3


COLLAPSED AREA
ADIT ENTRANCE
2920
2930
2936
2940
2946
To Brown House
Highway Right of Way - 60' from Centerline
TELEPHONE LINE ON HIGHWAY RIGHT OF WAY
YELLOW SIGN "NARROW BRIDGE"
Trench 3
Paved Highway 212
White Lines
Ashland, Mt. ≈1800 ft.
Tongue River Bridge ≈800 ft.
To Highway Dept Gravel Pit
Trench 1
Trench 2
ORANGE SIGN "TRUCKS ENTERING HIGHWAY"
Highway Right of Way - 80' from Centerline
75 ft
Driveway to Greee House on Hill
N
0 10 20 30 40 60
SCALE IN FEET
CONTOUR INTERVAL = 5 FT
LEGEND
2930 CONTOUR
UNDERGROUND MINE WORKINGS
DRAINAGE
HIGHWAY DEPT DRILL HOLES
ACTUAL UNDERGROUND OUTLINE
POSSIBLE UNDERGROUND OUTLINE
PICTURE NUMBER AND ORIENTATION
SP1 SUBSIDENCE PIT (SP) NUMBER (8 DEPTH)
CLOSED ADIT
9 7/8" EXPLORATION OR REAMING HOLES
4" EXPLORATION HOLES

ASHLAND HIGHWAY EMERGENCY PROJECT AMRB-90-01
GROUT REQUIRED PER DRILL HOLE INTO VOIDS

DRILL HOLE NUMBER	GROUT REQUIRED CUBIC YARDS
B-4	7
B-5	2
B-6	1
B-9	48
B-10	1
B-20	1/3
B-21	10 8/20
B-22	1/2
B-23	1/3
B-24	1/2
B-25	1/2
B-26	20 8/20
B-30	1
B-31	1
B-35	1/3
B-36	1/3
B-37	7
B-38	1
B-39	46 47/60
B-42	1/3
B-43	1/4
B-44	1/4
B-45	1/4
B-46	1/4
B-47	1/4
B-48	6
B-55	1/3
B-56	1/3
B-57	1/3
H-25	TRENCH
H-26	TRENCH
H-27	TRENCH
H-28	1
H-29	1
H-30	16
H-31	22 46/60
H-1	1/4
H-3	3
H-5	2
H-6	1/4
H-5	1/4
H-7	1/4
H-9	1/3
H-10	1
H-11	1
H-13	1
H-13	47 1/2
H-15	1 16/60
H-16	11 38/60
H-17	1
H-18	1
H-19	32
H-20	1
H-23	1
H-26	1
H-30	1/3
H-37	1
H-38	1/4
H-39	1/4
H-40	2
H-44	1/2
H-54	1/2
H-55	1/20
H-56	1/20
H-57	1/2
H-67	8
H-70	1/4
H-71	1/8
H-75	1/3
H-76	10
H-77	1/3
H-78	1/3
H-79	1/6
H-80	1/8
H-81	1/6
H-82	1/6
H-87	1
H-90	1/6
H-91	1/6
H-92	1/6
H-93	1/3
H-94	1/4
H-95	1/4
H-98	1/4
H-99	8 1/2
H-100	15
H-101	2
H-102	3 45/60
H-103	5
H-104	3
H-105	8
H-106	1 37/60
H-107	3
H-110	2
H-111	2
H-112	3
H-113	2
H-114	1/2

ASHLAND HIGHWAY EMERGENCY PROJECT AMRB-90-01
ROSEBUD COUNTY, MONTANA

DRILLING, GROUTING, GRAVEL AND TRENCHING SUMMARY INTO VOIDS

DRILLING QUANTITIES:

6" HOLE:	2333.0 FEET OF DRILLING
9 7/8" HOLE:	606.5 FEET OF DRILLING
9 7/8" REAMING:	313.5 FEET OF REAMING

TOTAL HOLES: 208 HOLES
TOTAL GROUT USED IN VOIDS: 404 23/60 YARDS

GRAVEL QUANTITIES:

A TOTAL OF 200 YARDS WAS USED. MOST OF THE GRAVEL WAS USED IN THE MAIN HAULAGE WAY AND ROOMS OFF THE MAIN HAULAGE WAY. MOST OF THE HOLES ENCOUNTERING 1 TO 2 FOOT VOID WOULD NOT TAKE ANY GRAVEL.

TRENCHING:

TRENCH 1 = 5 FT WIDE BY 10 FT LONG BY 2.5 TO 6.5 FT DEEP = 7 YARDS
TRENCH 2 = 10 FT WIDE BY 13 FT LONG BY 2.5 TO 5.5 FT DEEP = 15 YARDS
TRENCH 3 = 5 FT WIDE BY 11 FT LONG BY 9 FT DEEP = 19 YARDS

SPOT ADIT WIDTHS

A: BETWEEN HOLES H-11 AND H-12 THE ADIT IS 7 FT WIDE AND 9 FT HIGH.
B: AT HOLE H-16 THE ADIT IS 6.5 FT WIDE AND 5.5 FT HIGH.
C: AT HOLE H-102 THE ADIT IS 12 FT WIDE AND 6 FT HIGH.

Vertical Datum Based on Interpolation Of USGS 7 1/2' Quadrangle ASHLAND, MT. Topography Prepared From Ground Survey Conducted In 1990 By Spectrum Engineering Using A Plane Table And Alidade. This Topography Is Of Reconnaissance Class And Has Not Been Field Checked.

LANDOWNER

STATE OF MONTANA
DEPARTMENT OF HIGHWAYS
℅ BRUCE RUSSELL
P.O. BOX 890
GLENDIVE, MT. 59330
PHONE (406) 365-5296

NOTICE

AN ABANDONED COAL MINE UNDERLIES THIS SITE. MANY POTENTIAL HAZARDS EXIST. THE EXTENT OF THESE HAZARDS IS NOT FULLY KNOWN. CONTRACTORS AND OTHER PERSONS WORKING AT THE SITE SHALL APPRISE THEMSELVES OF THE CONDITIONS AND TAKE WHATEVER STEPS ARE DEEMED NECESSARY TO INSURE SAFETY WHILE PERFORMING THEIR DUTIES

① PICTURE 1 IS LOOKING SOUTHEAST TOWARD ASHLAND SHOWING THE HIGHWAY BORROW PIT ON THE NORTH SIDE.

② PICTURE 2 IS LOOKING NORTHEAST AT THE 5 HIGHWAY DEPARTMENT DRILL HOLES ON THE SOUTH SIDE OF THE ROAD.

③ PICTURE 3 IS LOOKING WEST TOWARD THE TONGUE RIVER. THE BORROW DITCH ON BOTH SIDES OF THE HIGHWAY CAN BE SEEN.

AS-BUILT

SITE PLAN AND GENERAL LAYOUT

ASHLAND HIGHWAY
(BENJAMIN HOLT MINE)
SECTION 10, T3S, R44E
ROSEBUD COUNTY, MONTANA

STATE OF MONTANA
DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU, RECLAMATION DIVISION

SPECTRUM ENGINEERING
Mining and Civil Engineers
3302 4th AVE NORTH
BILLINGS, MONTANA

DATE January 25, 1990
DRAWN BY: OLO
APPROVED BY:

REVISIONS NO	DATE	BY
1	5/5/90	LMP

SHEET NO 1 of 1

C. Chronological History

1. Contractors with previous experience in grouting and filling mine voids were contacted and ask to submit a bid based upon the bid package and pre-bid meeting. The following were contacted:

   Mitchell Brothers
   P.O. Box 736
   Glendive, MT 59330

   Donnes Construction
   4002 McGirl Road
   Billings, MT 59105

   Quality Concrete
   2111 4th Ave. North
   Billings, MT 59101

2. The pre-bid conference was held at the site at 11 a.m. on Tuesday, February 20th, 1990. Quality Concrete, Mitchell Brothers, Donnes Construction, State Highway Department and Range Telephone were in attendance. Bill Maehl from Spectrum Engineering and John Koerth from the AMR Bureau conducted the pre-bid meeting.

3. Bid were opened at 2 p.m. on Wednesday, February 28th, 1990. The bid tabulation and engineer's estimate are presented in Appendix D at the back of this report. Quality Concrete elected not to bid on this job.

4. The Notice of Award was issued on March 2nd, 1990 to the lowest bidder in the amount of $33,947.00. The Agreement was signed and the Contract was awarded on March 15th, 1990 to:

   Donnes Construction
   Phone: 406/373-6601
   MT Contractor's License: 5996 A

5. The pre-construction meeting was held on-site on March 21st, 1990. Frank Donnes (the contractor's superintendent) and his work crew and Bill Maehl (project engineer and inspector) from Spectrum Engineering were in attendance. Work began after the meeting.

6. The thirty day contract time started March 19th, 1990 per the Notice To Proceed.

7. All of the earthwork and revegetation were completed on April 2nd, 1990.

D. Equipment

1. Gardner-Denver Drill from Sunrise Drilling, Box 192, Hysham, Montana
2. Allis Chalmer 715 1/2 yard backhoe/front end loader
3. Terex 14 cu. yd TS 14 scraper
4. 10 yards cement truck from R.L. Schaff, Concrete Construction in Shepherd
5. Heugh H60 2 3/8 yard front end loader
6. Ford truck and 17 yard belly dump trailer

E. Daily Construction Log

Frank Donnes served as the Contractor's on-site superintendent. Bill Maehl served as Spectrum's construction inspector. The construction of the project was completed as follows:

March 21, 1990 - Held pre-construction meeting, set up highway signs, stripped topsoil, started exploration drilling. Poor weather forced a shut-down until the following Monday.

March 26, 1990 - Continued exploration drilling program.

March 27, 1990 - Continued drilling program. Underground voids do not match the old 1929 mine inspectors map.

March 28, 1990 - Completed drilling program. Filled the holes which had 2 or more feet of void with gravel. A total of 200 yards of gravel was used. Dug three trenches into the underground void to help define the voids.

March 29, 1990 - Waiting on cement and fly ash. Mapped the known voids on the surface with orange spray paint.

March 30, 1990 - Started grouting operation. Batching on-site at the Highway Department gravel pit. Conveyor belt feeds gravel, cement, and fly ash into a 10 yard cement truck. Hauled 16 loads of grout with most loads being 8 yards.

March 31, 1990 - Continued grouting operation hauling 14 loads of grout.

April 1, 1990 - Completed grouting operation hauling 21 loads of grout. A total of 413 yards of grout was used.

April 2, 1990 - Cold patch asphalt placed in all holes remaining in road not already filled with grout. Signs were reinstalled in borrow ditch. Topsoil was replaced (more put back than originally existed). Entire disturbance area was broadcast seeded at the rate of 50 pounds PLS per acre and hand raked. The seed mixture was 42% Western Wheatgrass, 29% Bluebunch and 29% Green Needle.

III. SLIDES

The description of the slides taken to document the work performed is found in Appendix A. The original slides are found at the back of one bound copy.

IV. COST SUMMARY

A. Final Payment Request and Reconciliation Change Order

A copy of the one and only Contractor's Payment Request and Reconciliatory Change Order is contained in Appendix B of this report. These documents summarize the final quantities and costs for each item.

B. Cost Per Site

1. Project Cost Summary

Site	Disturbed Acres	Cost/Acre	Total Project Cost
Ashland Highway	1.00	$ 110,299.89	$ 110,299.89

2. Project Cost Breakdown

Item	Quantity	Cost per Unit	Cost per Acre	Total Cost
Mobilization	1 L.S.	8900.00	8900.00	8900.00
Traffic Control	1 L.S.	4060.00	4060.00	4060.00
Drill 4" Holes	2333 Feet	1.07	2496.31	2496.31
Ream 4" Holes To 9 7/8" Holes	313.5 Feet	10.00	3135.00	3135.00
Drill 9 7/8" Holes	606.5 Feet	1.00	606.50	606.50
Gravel Placement Into Voids	200 Yards	26.70	5340.00	5340.00
Gravity Grout	304 23/60 Yards	175.00	53267.08	53267.08
Into Voids	100 Yards	300.00	30000.00	30000.00
Backfill Boreholes	208 Each	10.00	2080.00	2080.00
Mobilize Trench Equip.	1 L.S.	100.00	100.00	100.00
Trenching Traffic Control	1 L.S.	100.00	100.00	100.00
Salvage Topsoil	1 L.S.	10.00	10.00	10.00
Excavate and Backfill Trench	41 Yards	5.00	205.00	205.00
TOTAL			110299.89	110299.89

3. Cost Per Yard

The cost per acre numbers are fairly meaningless on this type of project. A total of 413 cubic yards of grout was placed in drill holes. The grout placed into voids accounted for 404 23/60 yards of the total.

V. SUMMARY

A. Completed Reclamation

The Contractor completed the sites involved in this project in the allowable contract time, using 19 calendar days of the 30 days allowed or 63% of the total. Drilling was stopped once due to weather conditions. This is typical when construction starts in March.

B. Comments

Donnes Construction did an excellent job completing the work. They worked long hours and through a weekend in order to minimize the total length of time the highway was subject to speed limits and flag people. Traffic was never stopped for longer than 5 minutes at one time.

The gravity grouting worked very well. It flowed and came up drill holes up to 50 feet away. The 4 inch holes took the grout as well as the 9 7/8 inch holes. However, it took 3 times longer to pour the same amount of material down the 4 inch hole as it did the 9 7/8 inch hole.

The asphalt was typically 4 to 6 inches thick. There were a few places where the asphalt was 4 feet thick (Holes H-37, H-38 and H-39). These areas must have been where gradual subsidence took place and asphalt was added a little bit each year.

C. Recommendations

The steel caps or covers for the 9 7/8 inch holes in the asphalt highway surface did not work well. The flat steel plate on the surface needs to be 1/2 inch steel with the pipe going down the hole being at least 3 feet long.

APPENDIX A

SLIDE DESCRIPTIONS

ASHLAND HIGHWAY EMERGENCY PROJECT
SLIDE DESCRIPTION

ASSIGNED NUMBER	DATE TAKEN	SUBJECT OR COMMENTS
1	3/21/90	Pre-construction view of Ashland Highway.
2	3/21/90	View of collapsed adit opening (no action taken).
3-6	3/21/90	North borrow ditch pre-construction, topsoil removal, drilled out and post-reclamation
7-10	3/21/90	Traffic control highway signs.
11-13	3/26/90	Drilling exploratory holes to define the void.
14-16	3/28/90	Gravel and funnel for placement of gravel into voids.
17-19	3/28/90	Gravel placement into drill holes.
20	3/28/90	Inside of 9 7/8 inch hole with gravel in bottom.
21	3/28/90	End of drill steel with cap for blowing gravel.
22	3/28/90	Trench 2 after being excavated.
23	3/28/90	Excavating trench 1.
24	3/28/90	Inside of trench 2.
25-27	3/28/90	Digging trench 3 with backhoe and drill.
28-32	3/30/90	Gravel pile and batching operation.
33-35	3/30/90	Grouting operation.
36-45	3/30/90	Outline of underground voids with slide 41 being pre-construction.
46-47	4/1-2/90	View of highway prior to reclamation.
48-50	4/1-2/90	View of north borrow ditch before and after reclamation.
51	4/1-2/90	Post-reclamation view of highway.
52-55	4/1-2/90	Pre-reclamation view of south borrow ditch.
56-59	4/1-2/90	Post-reclamation view of south borrow ditch.
60	4/2/90	Pre-reclamation view of south borrow ditch.

ASHLAND HIGHWAY EMERGENCY PROJECT
SLIDE DESCRIPTION

ASSIGNED NUMBER	DATE TAKEN	SUBJECT OR COMMENTS
61-64	4/2/90	Post-reclamation view of south borrow ditch.
65-66	4/2/90	Post-reclamation view of north fill slope.
67	4/2/90	Temporary cover (steel cap) for 9 7/8 inch holes in highway prior to backfilling.
68	4/2/90	Terex scraper for topsoil removal.

APPENDIX B

FINAL PAY REQUEST
AND
CHANGE ORDER

PAYMENT REQUEST NO. 1
Final Payment Request

From: March 15, 1990 To: April 3, 1990
Project Name: Ashland Highway Emergency Project
Location: Rosebud County, Montana Project No.: AMRB-90-01
Name of Contractor: Donnes Construction Address: 4002 McGirl Road
Billings, MT 59105

Summary Of Project Status

Amount of Original Contract	$ 33,947.00
Amount of Approved Change Order(s)	76,352.89
TOTAL CONTRACT AMOUNT	110,299.89
Contract Time Used to Date	19 Days
Percentage of Contract Time Used	63 %
Percentage of Contract Amount Earned	100 %

Original Contract Amount Completed	33,947.00
Change Order(s) Amount Completed	76,352.89
Amount for Material On Site	0.00
TOTAL AMOUNT Earned to Date	110,299.89
Less Previous Amount Earned	0.00
Amount Payable This Period	110,299.89
Less 1% Gross Receipts Tax	1,103.00
TOTAL DUE CONTRACTOR THIS PERIOD	109,196.89

Requested By: Donnes Construction Frank Donnes (Contractor) Date: 4/6/90

Checked By: Spectrum Engineering William C Maehl (Engineer) Date: 4/6/90

Approved By: Department of State Lands Abandoned Mine Reclamation Bureau (Owner) Date: 4/10/90

SECTION II

2.12 CHANGE ORDER

Order No. 1

Date: 4/05/89

Agreement Date: 3/02/90

NAME OF PROJECT: Ashland Highway Emergency Project
Rosebud County, Montana AMRB-90-01

OWNER: Montana Department of State Lands, Abandoned Mine Reclamation Bureau

CONTRACTOR: Donnes Construction

Change Orders must be accompanied by an itemized cost breakdown. You are hereby requested to comply with the following changes from the Contract Documents. (Show separate costs for materials, labor, equipment, and miscellaneous. Show Percent where applicable.)

ITEM NO.	DESCRIPTION OF CHANGES - ESTIMATED QUANTITIES & UNITS	COST OF CHANGES					TOTAL COST
		MAT'LS.	LABOR	EQUIP.	MISC.	TOTAL UNIT COST	
3.	Drill 4" Exploratory Holes						$ 891.31
4.	Ream 4" Holes to 9 7/8 Holes						1,935.00
5.	Drill 9 7/8 Holes						186.50
6.	8" ID Plastic Casing						- 700.00
7.	Gravel Placement Into Void						-2,002.00
8.	Gravity Grout Into Void						75,767.08
9.	Backfill Boreholes						1,330.00
13.	Debris Removal						- 10.00
14.	Excavate and Backfill Trench						-1,045.00
	SEE ATTACHED DETAILED BREAKDOWN						

TOTAL COST - MAT'LS, LABOR, EQUIPMENT & MISC. $76,352.89

OVERHEAD & PROFIT @ % N/A

GRAND TOTAL - THIS CHANGE ORDER $76,352.89

Original Contract Price	$33,947.00
Current Contract Price Adjusted by Previous Change Order	33,947.00
Cost this Change Order (+ or -)	+ 76,352.89
New Contract Price Including this Change Order	$110,299.89

The completion date as set forth in the Contract Documents shall be ([✓ unchanged], increased, decreased) by 0 calendar days.

The date for completion of all work will be April 3, 1990.

Description and Justification for Change:

1. The bid amount was for the least amount of work (almost no voids under Highway 212). The actual voids encountered resembled the worst case (Case 3) presented in the bid package. The unit prices for additional work are consistent with those for the original contract work. The grout price dropped from $300 per yard after the first 100 yards to $175 per yard.

SURETY CONSENT

The Surety hereby consents to the aforementioned Contract Change Order and agrees that its bonds shall apply and extend to the contract as there by modified or amended per this Change Order. The Principal and the surety further agree that on or after execution of this consent, the penalty of the applicable Performance Bond or Bonds is hereby increased by ________________ ($________________) (one hundred (100) percent of the Change Order amount) and the penalty of the applicable Payment Bond or Bonds is hereby increased by ________________ ($____________) (one hundred (100) percent of the Change Order amount).

COUNTERSIGNED BY MONTANA RESIDENT AGENT

SURETY

____

____

____

By: ______________________________ (Seal)

Recommended by: William C Maehl, Engineer

Accepted by: Frank Downes, Contractor

Approved by: Larry Mitchell 4/10/90, Owner

SECTION II

2.1 PROPOSAL (cont.)

DONNES CONSTRUCTION

				BID SHEET CASE 1		AS BUILT	
Item No.	Estimated Quantity	Unit	Description	Unit Price	Total Price	Unit	Price
1.	1	LS	MOBILIZATION	XXXX	8900	XXXX	8900.00
2.	1	LS	TRAFFIC CONTROL	XXXX	4060	XXXX	4060.00
3.	1500	FEET	DRILL 4" DIAMETER EXPLORATORY HOLES	1.07	1605	2333	2496.31
4.	120	FEET	REAMING 4" HOLES TO 9 7/8 DIA. HOLES	10.00	1200	313.5	3135.00
5.	420	FEET	DRILL 9 7/8" HOLES	1.00	420	606.5	606.50
6.	140	FEET	8" ID PLASTIC CASING	5.00	700	0	0.00
7.	275	LCY	GRAVEL PLACEMENT INTO VOID	26.70	7342	200	5340.00
8.	25	LCY	GRAVITY GROUT INJ. INTO VOID	300.00	7500	100 304 23/60	30000.00 53267.08
9.	75	EACH	BACKFILL BOREHOLES	10.00	750	208	2080.00
POSSIBLE ADDITIONAL WORK							
10.	1	LS	MOBILIZE EXCAVATION EQUIPMENT	XXXX	100	XXXX	100.00
11.	1	LS	TRENCHING TRAFFIC CONTROL	XXXX	100	XXXX	100.00
12.	1	LS	SALVAGE TOPSOIL	XXXX	10	XXXX	10.00
13.	1	LS	DEBRIS REMOVAL	XXXX	10	XXXX	0.00
14.	250	BCY	EXCAVATE AND BACKFILL TRENCH	5.00	1250	41	205.00

TOTAL BASE BID: $ 33,947
(Price in Numbers)

TOTAL ACTUAL AMOUNT (AS BUILT) $ 110,299.89

TOTAL CHANGE ORDER AMOUNT (AS BUILT) $ 76,352.89

APPENDIX C

ENGINEERING VERSUS CONSTRUCTION COST ANALYSIS

ASHLAND HIGHWAY EMERGENCY PROJECT
FINAL REPORT

ANALYSIS OF PROFESSIONAL SERVICE FEES
DATE OF PREPARATION: APRIL 6, 1990

PROFESSIONAL SERVICE	AMOUNT
o Data Gathering, Site Evaluation, Mapping, Preliminary and Final Engineering, Bid Documents	$ 8,061.88
o Construction Administration, Construction Inspection, Final Report Preparation	$ 4,538.73
SPECTRUM ENGINEERING COSTS	$ 12,600.61
FINAL CONSTRUCTION COST	$110,299.89

PERCENTAGE ANALYSIS	PERCENT
DESIGN ENGINEERING COST COMPARED TO CONSTRUCTION COST	7.3 %
CONSTRUCTION ENGINEERING COST COMPARED TO CONSTRUCTION COST	4.1 %
TOTAL ENGINEERING COST COMPARED TO CONSTRUCTION COST	11.4 %

REMARKS: Services provided include landowner contact and consent, budget preparation, basic engineering design, bid document preparation, construction staking, contract administration, quantity accounting and full time construction/reclamation inspection.

APPENDIX D

BID TABULATION AND

ENGINEER'S ESTIMATE

ENGINEER'S ESTIMATE
ASHLAND HIGHWAY
EMERGENCY PROJECT
FEBRUARY 28, 1990

SECTION II

2.1 PROPOSAL (cont.)

BID SHEET

Item No.	Estimated Quantity	Unit	Description	Unit Price	Total Price
1.	1	LUMP SUM	MOBILIZATION	XXXXXXX	10,000
2.	1	LUMP SUM	TRAFFIC CONTROL	XXXXXXX	5,000
3.	1500	FEET	DRILL 4" DIAMETER EXPLORATORY HOLES	4.50	6,750
4.	120	FEET	REAMING 4" HOLES TO 9 7/8 DIA. HOLES	8.50	1,020
5.	420	FEET	DRILL 9 7/8" DIA HOLES	8.50	3,570
6.	140	FEET	8" ID PLASTIC CASING	6.50	910
7.	275	LCY	GRAVEL PLACEMENT INTO VOID	20.00	5,500
8.	25	LCY	GRAVITY GROUT INJECTION INTO VOID	89.00	2,225
9.	75	EACH	BACKFILL BOREHOLES	65.00	4,875
POSSIBLE ADDITIONAL WORK					
10.	1	LUMP SUM	MOBILIZE EXCAVATION EQUIPMENT	XXXXXXX	1,000
11.	1	LUMP SUM	TRENCHING TRAFFIC CONTROL	XXXXXXX	3,000
12.	1	LUMP SUM	SALVAGE/REPLACE TOPSOIL	XXXXXXX	200
13.	1	LUMP SUM	DEBRIS REMOVAL	XXXXXXX	100
14.	250	BCY	EXCAVATE AND BACKFILL TRENCH	4.00	1,000

TOTAL BASE BID: $ 45,150.00
(Price in Numbers)

Forty-five thousand one-hundred fifty and 00/100
(Price in Words)

Bid Items 10 through 14 may or may not be completed depending upon the results of Bid Items 3 through 5. If Bid Items 10 through 14 are not needed then NO PAYMENT will be allowed for these items. Bid Items 3 through 9 and 14 will vary with each case.

SECTION II

2.1 PROPOSAL (cont.)

DONNES CONSTRUCTION

				BID SHEET CASE 1		CASE 2		CASE 3	
Item No.	Estimated Quantity	Unit	Description	Unit Price	Total Price	Unit	Price	Unit	Price
1.	1	LS	MOBILIZATION	XXXX	8900	XXXX	8900	XXXX	8900
2.	1	LS	TRAFFIC CONTROL	XXXX	4060	XXXX	4060	XXXX	4060
3.	1500	FEET	DRILL 4" DIAMETER EXPLORATORY HOLES	1.07	1605	1620	1733	2000	2140
4.	120	FEET	REAMING 4" HOLES TO 9 7/8 DIA. HOLES	10.00	1200	180	1800	240	2400
5.	420	FEET	DRILL 9 7/8" HOLES	1.00	420	720	720	840	840
6.	140	FEET	8" ID PLASTIC CASING	5.00	700	140	700	140	700
7.	275	LCY	GRAVEL PLACEMENT INTO VOID	26.70	7342	400	10680	600	16020
8.	25	LCY	GRAVITY GROUT INJ. INTO VOID	300.00	7500	200	60000	300	90000
9.	75	EACH	BACKFILL BOREHOLES	10.00	750	81	810	100	1000
POSSIBLE ADDITIONAL WORK									
10.	1	LS	MOBILIZE EXCAVATION EQUIPMENT	XXXX	100	XXXX	100	XXXX	100
11.	1	LS	TRENCHING TRAFFIC CONTROL	XXXX	100	XXXX	100	XXXX	100
12.	1	LS	SALVAGE TOPSOIL	XXXX	10	XXXX	10	XXXX	10
13.	1	LS	DEBRIS REMOVAL	XXXX	10	XXXX	10	XXXX	10
14.	250	BCY	EXCAVATE AND BACKFILL TRENCH	5.00	1250	850	4250	850	4250
TOTAL BASE BID:				$ 33,947 (Price in Numbers)			$ 93,873		$ 130,530
							$ 83,873		$ 110,530
							with $200/yd grout after 1st 100 yds		with $200/yd grout after 1st 100 yds

SECTION II

2.1 PROPOSAL (cont.)

MITCHELL BROTHERS

BID SHEET

				CASE 1		CASE 2		CASE 3	
Item No.	Estimated Quantity	Unit	Description	Unit Price	Total Price	Unit	Price	Unit	Price
1.	1	LS	MOBILIZATION	XXXX	8000	XXXX	8000	XXXX	8000
2.	1	LS	TRAFFIC CONTROL	XXXX	9500	XXXX	9500	XXXX	9500
3.	1500	FEET	DRILL 4" DIAMETER EXPLORATORY HOLES	8.00	12000	1620	12960	2000	16000
4.	120	FEET	REAMING 4" HOLES TO 9 7/8 DIA. HOLES	10.00	1200	180	1800	240	2400
5.	420	FEET	DRILL 9 7/8" HOLES	10.00	4200	720	7200	840	8400
6.	140	FEET	8" ID PLASTIC CASING	6.00	840	140	840	140	840
7.	275	LCY	GRAVEL PLACEMENT INTO VOID	30.00	8250	400	12000	600	18000
8.	25	LCY	GRAVITY GROUT INJ. INTO VOID	110.00	2750	200	22000	300	33000
9.	75	EACH	BACKFILL BOREHOLES	50.00	3750	81	4050	100	5000
POSSIBLE ADDITIONAL WORK									
10.	1	LS	MOBILIZE EXCAVATION EQUIPMENT	XXXX	1500	XXXX	1500	XXXX	1500
11.	1	LS	TRENCHING TRAFFIC CONTROL	XXXX	9600	XXXX	9600	XXXX	9600
12.	1	LS	SALVAGE TOPSOIL	XXXX	250	XXXX	250	XXXX	250
13.	1	LS	DEBRIS REMOVAL	XXXX	100	XXXX	100	XXXX	100
14.	250	BCY	EXCAVATE AND BACKFILL TRENCH	40.00	10000	850	34000	850	34000
TOTAL BASE BID:				$ 71,940 (Price in Numbers)		$123,800		$ 146,590	

APPENDIX E

CONSTRUCTION INSPECTION

FIELD DATA

DRILLING, GROUTING AND GRAVEL SUMMARY

ASHLAND HIGHWAY EMERGENCY PROJECT AMRB-90-01
ROSEBUD COUNTY, MONTANA

DRILLING, GROUTING AND GRAVEL SUMMARY

DRILL HOLE NUMBER	VOID	4 INCH EXPLORATION FOOTAGE	9 7/8 INCH EXPLORATION FOOTAGE	9 7/8 INCH REAMING FOOTAGE	GROUT REQUIRED CUBIC YARDS	GROUT QUANTITY FOR PAY PURPOSES IN CUBIC YARDS
S-1		19.0			1/20	
S-2		18.5			1/20	
S-3		19.0			1/20	
S-4	void	17.0		17.0	7	7
S-5	void		17.5		2	2
S-6			21.0		1/3	
S-7			21.0		1/3	
S-8	void	19.0		11.0	1	1
S-9	void		19.5		48	48
S-10	void		11.5		1	1
S-11		20.0			1/20	
S-12		20.0			1/20	
S-13		20.0			1/20	
S-14		20.0			1/20	
S-15		20.0			1/20	
S-16		20.0			1/20	
S-17		20.0			1/20	
S-18		20.0			1/20	
S-19		20.0			1/20	
S-20	void	13.0		12.5	1/3	1/3
S-21	void		17.0		10 8/20	10 8/20
S-22	void		7.0		1/2	1/2
S-23	void		3.5		1/2	1/2
S-24	void		3.0		1/2	1/2
S-25	void		6.0		1/2	1/2
S-26	void		9.5		29 8/20	29 8/20
S-27			20.0		1/3	
S-28		20.0			1/20	
S-29		20.0			1/20	
S-30	void	12.0		12.0	1	1
S-31	void		12.0		1	1
S-32			20.0		1/3	
S-33		20.0			1/20	
S-34		20.0			1/20	
S-35	void	17.0		12.0	1/2	1/2
S-36	void		11.5		1/2	1/2
S-37	void	18.0		13.0	7	7
S-38	void		10.5		1	1
S-39	void		11.0		46 47/60	46 47/60
S-40			20.0		1/3	
S-41		20.0			1/20	
S-42	void	20.0		17.0	1/3	1/3
S-43	void	20.0			1/4	1/4
S-44	void	20.0			1/4	1/4
S-45	void	20.0			1/4	1/4
S-46	void	30.0			1/4	1/4
S-47	void	20.0			1/4	1/4
S-48	void	17.5			6	6

ASHLAND HIGHWAY EMERGENCY PROJECT AMRB-90-01
ROSEBUD COUNTY, MONTANA

DRILLING, GROUTING AND GRAVEL SUMMARY

DRILL HOLE NUMBER	VOID	4 INCH EXPLORATION FOOTAGE	9 7/8 INCH EXPLORATION FOOTAGE	9 7/8 INCH REAMING FOOTAGE	GROUT REQUIRED CUBIC YARDS	GROUT QUANTITY FOR PAY PURPOSES IN CUBIC YARDS
S-49		20.0			1/20	
S-50		20.0			1/20	
S-51		20.0			1/20	
S-52		20.0			1/20	
S-53		20.0			1/20	
S-54		20.0			1/20	
S-55	void	10.0		10.0	1/3	1/3
S-56	void		15.0		1/3	1/3
S-57	void		11.5		1/3	1/3
N-1		20.0			1/20	
N-2		20.0			1/20	
N-3		20.0			1/20	
N-4		20.0			1/20	
N-5		20.0			1/20	
N-6		20.0			1/20	
N-7		20.0			1/20	
N-8		20.0			1/20	
N-9		20.0			1/20	
N-10		20.0			1/20	
N-11		16.0			1/20	
N-12		16.0			1/20	
N-13		16.0			1/20	
N-14		16.0			1/20	
N-15		16.0			1/20	
N-16		16.0			1/20	
N-17		16.0			1/20	
N-18		16.0			1/20	
N-19		16.0			1/20	
N-20		16.0			1/20	
N-21		17.0			1/20	
N-22		17.0			1/20	
N-23		18.0			1/20	
N-24		19.0			1/20	
N-25	void	10.0		10.0	0	TRENCH
N-26	void		9.0		0	TRENCH
N-27	void		9.0		0	TRENCH
N-28	void		9.0		1	1
N-29	void		7.5		1	1
N-30	void		8.0		16	16
N-31	void		8.0		22 46/60	22 46/60
N-32			18.0		1/3	
N-33		17.0			1/20	
N-34		17.0			1/20	
N-35		17.0			1/20	
N-36		17.0			1/20	
N-37		17.0			1/20	
N-38		17.0			1/20	

ASHLAND HIGHWAY EMERGENCY PROJECT AMRB-90-01
ROSEBUD COUNTY, MONTANA

DRILLING, GROUTING AND GRAVEL SUMMARY

DRILL HOLE NUMBER	VOID	4 INCH EXPLORATION FOOTAGE	9 7/8 INCH EXPLORATION FOOTAGE	9 7/8 INCH REAMING FOOTAGE	GROUT REQUIRED CUBIC YARDS	GROUT QUANTITY FOR PAY PURPOSES IN CUBIC YARDS
N-39		12.5			1/20	
N-40		12.5			1/20	
H-1	void	12.0			1/4	1/4
H-2	void	12.0			2	2
H-3	void	8.0			2	2
H-4	void	7.5			1/4	1/4
H-5	void	15.0		15.0	1/4	1/4
H-6		14.0			1/20	
H-7	void	10.0		10.0	1/4	1/4
H-8		14.0			1/20	
H-9	void		15.0		1/3	1/3
H-10	void		10.0		1	1
H-11	void		10.0		1	1
H-12	void		11.0		1	1
H-13	void		11.0		47 1/2	47 1/2
H-14			13.0		1/3	
H-15	void		10.0		1 16/60	1 16/60
H-16	void		10.0		13 38/60	13 38/60
H-17	void		11.5		1	1
H-18	void		7.0		1	1
H-19	void		7.0		32	32
H-20	void	10.0		10.0	1	1
H-21		14.0			1/20	
H-22		14.0			1/20	
H-23	void	9.0		9.0	1	1
H-24			15.0		1/3	
H-25			13.0		1/3	
H-26			15.0		1/3	
H-27		14.0			1/20	
H-28	void	10.0			1	1
H-29		14.0			1/20	
H-30	void	6.0		17.0	1/3	1/3
H-31		15.0			1/20	
H-32		14.5			1/20	
H-33		14.5			1/20	
H-34		14.0			1/20	
H-35		13.5			1/20	
H-36		13.5			1/20	
H-37	void	9.5		11.5	1	1
H-38	void	14.0			1/4	1/4
H-39	void	13.0			1/4	1/4
H-40	void	5.0		10.0	2	2
H-41		13.5			1/20	
H-42		13.5			1/20	
H-43		13.5			1/20	
H-44	void	11.0			1/2	1/2

ASHLAND HIGHWAY EMERGENCY PROJECT AMRB-90-01
ROSEBUD COUNTY, MONTANA

DRILLING, GROUTING AND GRAVEL SUMMARY

DRILL HOLE NUMBER	VOID	4 INCH EXPLORATION FOOTAGE	9 7/8 INCH EXPLORATION FOOTAGE	9 7/8 INCH REAMING FOOTAGE	GROUT REQUIRED CUBIC YARDS	GROUT QUANTITY FOR PAY PURPOSES IN CUBIC YARDS
H-45		14.0			1/20	
H-46		14.0			1/20	
H-47		13.5			1/20	
H-48		13.5			1/20	
H-49		13.5			1/20	
H-50		13.5			1/20	
H-51		13.0			1/20	
H-52		13.0			1/20	
H-53		13.0			1/20	
H-54	void	10.0			1/2	1/2
H-55	void	8.0			1/20	1/20
H-56	void	8.0			1/20	1/20
H-57	void	15.0			1/2	1/2
H-58		13.5			1/20	
H-59		12.0			1/20	
H-60		12.5			1/20	
H-61		12.5			1/20	
H-62		12.5			1/20	
H-63		12.5			1/20	
H-64		12.5			1/20	
H-65		16.5			1/20	
H-66		16.0			1/20	
H-67	void	14.0			9	9
H-68		20.0			1/20	
H-69		14.0			1/20	
H-70	void	9.0			1/6	1/6
H-71	void	8.5			1/6	1/6
H-72		13.5			1/20	
H-73		14.0			1/20	
H-74		no H-74				
H-75	void	11.0		10.5	1/3	1/3
H-76	void	7.5			10	10
H-77	void	5.0		15.0	1/3	1/3
H-78	void	6.5		13.0	1/3	1/3
H-79	void	6.5			1/6	1/6
H-80	void	20.0		11.0	1/6	1/6
H-81	void	5.5			1/6	1/6
H-82	void	4.5			1/6	1/6
H-83		13.5			1/20	
H-84		13.5			1/20	
H-85		13.5			1/20	
H-86		13.0			1/20	
H-87	void	11.0		11.0	1	1
H-88		14.5			1/20	
H-89		14.0			1/20	
H-90	void	19.0			1/6	1/6
H-91	void	12.0		13.0	1/6	1/6
H-92	void	7.0		13.0	1/6	1/6

ASHLAND HIGHWAY EMERGENCY PROJECT AMRB-90-01
ROSEBUD COUNTY, MONTANA

DRILLING, GROUTING AND GRAVEL SUMMARY

DRILL HOLE NUMBER	VOID	4 INCH EXPLORATION FOOTAGE	9 7/8 INCH EXPLORATION FOOTAGE	9 7/8 INCH REAMING FOOTAGE	GROUT REQUIRED CUBIC YARDS	GROUT QUANTITY FOR PAY PURPOSES IN CUBIC YARDS
H-93	void	7.0			1/3	1/3
H-94	void	11.0		11.0	1/4	1/4
H-95	void	9.0			1/4	1/4
H-96	void		14.5		1/4	1/4
H-97		no H-97				
H-98		no H-98				
H-99	void		11.0		8 1/2	8 1/2
H-100	void		8.0		15	15
H-101	void		9.0		2	2
H-102	void		8.0		2 45/60	2 45/60
H-103	void		9.0		8	8
H-104	void		8.5		3	3
H-105	void		8.5		8	8
H-106	void		11.5		1 37/60	1 37/60
H-107	void		11.0		2	2
H-108			12.5		1/3	
H-109		13.5			1/20	
H-110	void	19.0			2	2
H-111	void	20.0			2	2
H-112	void	16.5			2	2
H-113	void	13.5			2	2
H-114	void	11.0		19.0	1/2	1/2

DRILLING QUANTITIES:

4" HOLE	2333 FT				
9 7/8" HOLE		606.5 FT			
9 7/8" REAMING			313.5 FT		
TOTAL GROUT USED				413	
GROUT FOR PAY QUANTITY					404 23/60

GRAVEL QUANTITIES:

13 LOADS OF GRAVEL AT 16 YARDS PER LOAD WERE HAULED TO THE SITE. ONE-HALF LOAD WAS LEFT AT THE REMAINDER OF THE JOB. A TOTAL OF 200 YARDS [(13x16) - (0.5x16)] WERE USED. MOST OF THE GRAVEL WAS USED IN THE MAIN HAULAGE WAY AND ROOMS OFF THE MAIN HAULAGE WAY. MOST OF THE HOLES ENCOUNTERING 1 TO 2 FOOT VOID WOULD NOT TAKE ANY GRAVEL.

FOOTNOTE: VOLUME OF A 4 INCH DIAMETER HOLE IS: 3.1417 x (2/12) x (2/12) x DEPTH ASSUMING ALL NON-VOID 4" HOLES TO BE 15 TO 20 FEET DEEP, THEY REQUIRE 1/20 OF A YARD OF GROUT PER HOLE.

VOLUME OF A 9 7/8 INCH DIAMETER HOLE IS: 3.1417 x (4.938/12) x (4.938/12) x DEPTH. ASSUMING ALL NON-VOID 9 7/8" HOLES TO BE 15 TO 20 FEET DEEP, THEY REQUIRE 1/3 OF A YARD OF GROUT PER HOLE.

GROUT MIX HAD 100 LBS/CY CEMENT AND 600 LBS/CY FLY ASH

GROUT BY LOAD SUMMARY

ASHLAND HIGHWAY EMERGENCY PROJECT AMRB-90-01
ROSEBUD COUNTY, MONTANA

GROUT BY LOAD SUMMARY

DATE	LOAD NUMBER	CUBIC YARDS PER LOAD	DRILL HOLE NUMBER	GROUT REQUIRED CUBIC YARDS	NOTES
3/30	1	8	H-19	8	
	2	8	H-101 H-103	2 6	
	3	9	H-103 H-100	2 7	
	4	8	H-19	8	
	5	8	H-19	8	
	6	8	H-19	8	
	7	8	S-9	8	
	8	8	S-9	8	MUD OBSERVED IN HOLE S-8
	9	8	S-9	8	MUD OBSERVED IN HOLE H-44
	10	8	S-9	8	MUD OBSERVED IN HOLE S-10
	11	8	S-9	8	MUD OBSERVED IN HOLE H-28
	12	8	S-9 S-8 S-10	6 1 1	
	13	8	S-9 H-20 S-4	2 1 5	
	14	8	S-4 S-5 S-6 S-7 S-11 S-12 S-14 S-16 S-17 S-18 S-20 S-21	2 2 1/3 1/3 1/20 1/20 1/20 1/20 1/20 1/20 1/3 2 14/20	

ASHLAND HIGHWAY EMERGENCY PROJECT AMRB-90-01
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GROUT BY LOAD SUMMARY

DATE	LOAD NUMBER	CUBIC YARDS PER LOAD	DRILL HOLE NUMBER	GROUT REQUIRED CUBIC YARDS	NOTES
3/30	15	8	S-1	1/20	
			S-2	1/20	
			S-3	1/20	
			S-13	1/20	
			S-15	1/20	
			S-19	1/20	
			S-21	7 14/20	
	16	9	H-14	1/3	
			H-15	1 16/60	
			H-17	1	
			H-18	1	
			H-21	1/20	
			H-22	1/20	
			H-23	1	
			H-24	1/3	
			H-25	1/3	
			H-26	1/3	
			H-27	1/20	
			H-28	1	
			H-32	1/20	
			H-33	1/20	
			H-34	1/20	
			H-35	1/20	
			H-36	1/20	
			S-22	1/2	
			S-23	1/2	
			S-24	1/2	
			S-25	1/2	
3/31	17	8	S-49	1/20	
			S-50	1/20	
			S-51	1/20	
			S-52	1/20	
			S-53	1/20	
			S-54	1/20	
			N-1	1/20	
			N-2	1/20	
			N-3	1/20	
			N-4	1/20	
			N-5	1/20	
			N-6	1/20	
			N-7	1/20	
			N-8	1/20	
			N-9	1/20	
			N-10	1/20	
			N-11	1/20	
			N-12	1/20	

ASHLAND HIGHWAY EMERGENCY PROJECT AMRB-90-01
ROSEBUD COUNTY, MONTANA

GROUT BY LOAD SUMMARY

DATE	LOAD NUMBER	CUBIC YARDS PER LOAD	DRILL HOLE NUMBER	GROUT REQUIRED CUBIC YARDS	NOTES
3/31	17		N-13	1/20	
			N-14	1/20	
			N-15	1/20	
			N-16	1/20	
			N-17	1/20	
			N-18	1/20	
			N-19	1/20	
			N-20	1/20	
			N-21	1/20	
			N-22	1/20	
			N-23	1/20	
			N-24	1/20	
			N-31	5 46/60	
			N-32	1/3	
			N-33	1/20	
			N-34	1/20	
			N-35	1/20	
			N-36	1/20	
			N-37	1/20	
			N-38	1/20	
			N-39	1/20	
			N-40	1/20	
	18	8	H-6	1/20	
			H-8	1/20	
			H-9	1/3	
			H-29	1/20	
			H-30	1/3	
			H-31	1/20	
			H-41	1/20	
			H-42	1/20	
			H-43	1/20	
			H-44	1/2	
			H-45	1/20	
			H-46	1/20	
			H-47	1/20	
			H-48	1/20	
			H-49	1/20	
			H-50	1/20	
			H-51	1/20	
			H-52	1/20	
			H-53	1/20	
			H-58	1/20	
			H-59	1/20	
			H-60	1/20	
			H-61	1/20	
			H-62	1/20	
			H-63	1/20	

ASHLAND HIGHWAY EMERGENCY PROJECT AMRB-90-01
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GROUT BY LOAD SUMMARY

DATE	LOAD NUMBER	CUBIC YARDS PER LOAD	DRILL HOLE NUMBER	GROUT REQUIRED CUBIC YARDS	NOTES
3/31	18		H-64	1/20	
			H-65	1/20	
			H-66	1/20	
			H-68	1/20	
			H-69	1/20	
			H-70	1/6	
			H-71	1/6	
			H-72	1/20	
			H-83	1/20	
			H-84	1/20	
			H-85	1/20	
			H-86	1/20	
			H-87	1/20	
			H-88	1/20	
			H-89	1/20	
			S-55	1/3	
			S-56	1/3	
			S-57	1/3	
			H-102	2 45/60	
	19	8	S-43	1/4	
			S-44	1/4	
			S-45	1/4	
			S-46	1/4	
			S-47	1/4	
			S-48	6	
			H-94	1/4	
			H-95	1/4	
			H-96	1/4	
	20	8	S-39	5 47/60	
			S-40	1/3	
			S-41	1/20	
			S-42	1/3	
			H-79	1/6	
			H-80	1/6	
			H-81	1/6	
			H-82	1/6	
			H-90	1/6	
			H-91	1/6	
			H-92	1/6	
			H-93	1/3	
	21	8	S-39	8	
	22	8	S-39	8	

ASHLAND HIGHWAY EMERGENCY PROJECT AMRB-90-01
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GROUT BY LOAD SUMMARY

DATE	LOAD NUMBER	CUBIC YARDS PER LOAD	DRILL HOLE NUMBER	GROUT REQUIRED CUBIC YARDS	NOTES
3/31	23	8	S-39	8	
	24	8	S-39	8	MUD OBSERVED IN HOLE H-110
	25	8	S-39	8	MUD OBSERVED IN HOLE H-15
	26	8	S-39	1	
			S-37	7	MUD OBSERVED IN HOLES H-15 AND S-31
	27	9	S-38	1	
			H-110	2	
			H-111	2	
			H-112	2	
			H-113	2	
	28	9	H-114	1/2	
			H-67	8 1/2	
	29	8	H-67	1/2	
			H-75	1/3	
			H-76	6 1/2	
			H-77	1/3	
			H-78	1/3	
	30	9	S-27	1/3	
			S-28	1/20	
			S-29	1/20	
			S-30	1	
			S-31	1	
			S-32	1/3	
			S-33	1/20	
			S-34	1/20	
			S-35	1/2	
			S-36	1/2	
			H-16	5 8/60	
4/1	31	8	H-16	8	
	32	8	H-16	1/2	
			H-13	7 1/2	
	33	8	H-13	8	MUD OBSERVED IN HOLE H-10 AND H-12
	34	8	H-13	8	MUD OBSERVED IN HOLE H-10, H-11 AND H-12

ASHLAND HIGHWAY EMERGENCY PROJECT AMRB-90-01
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GROUT BY LOAD SUMMARY

DATE	LOAD NUMBER	CUBIC YARDS PER LOAD	DRILL HOLE NUMBER	GROUT REQUIRED CUBIC YARDS	NOTES
4/1	35	8	H-13	8	
	36	8	H-13	8	
	37	8	H-13	8	
	38	8	N-31	8	
	39	8	N-31	8	
	40	8	N-31	1	
			N-30	7	
	41	8	N-30	8	
	42	8	N-30	1	
			N-29	1	
			N-28	1	
			H-10	1	
			H-11	1	
			H-12	1	
			H-40	2	
	43	8	H-1	1/4	
			H-2	2	
			H-3	2	
			H-4	1/4	
			H-5	1/4	
			H-7	1/4	
			H-38	1/4	
			H-39	1/4	
			H-37	1	
			H-76	1 1/2	
	44	8	H-76	2	
			H-54	1/2	
			H-55	1/20	
			H-56	1/20	
			H-57	1/2	
			S-26	4 18/20	
	45	8	S-26	8	
	46	8	S-26	8	
	47	8	S-26	8	

ASHLAND HIGHWAY EMERGENCY PROJECT AMRB-90-01
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GROUT BY LOAD SUMMARY

DATE	LOAD NUMBER	CUBIC YARDS PER LOAD	DRILL HOLE NUMBER	GROUT REQUIRED CUBIC YARDS	NOTES
4/1	48	8	S-26	1/2	
			H-99	7 1/2	
	49	8	H-99	1	
			H-100	7	
	50	8	H-100	1	
			H-107	2	
			H-105	5	
	51	8	H-105	3	
			H-104	3	
			H-106	1 37/60	
			H-108	1/3	
			H-109	1/20	
3 DAYS	1-51	413	208 HOLES	413 CU. YDS.	

DRILL HOLE SUMMARY

ASHLAND HIGHWAY EMERGENCY PROJECT AMRB-90-01
ROSEBUD COUNTY, MONTANA

DRILLING SUMMARY FOR 3/21/1990
DATE

SPACING BETWEEN HOLES	DRILL HOLE NUMBER	FROM	TO	DESCRIPTION	DRILL HOLE FOOTAGE	BIT SIZE (IN.)	DRILLING OR REAMING
	S-1	0	12	SANDY CLAY			
5 FT		12	19	COAL	19 FT	4	DRILLING
	S-2	0	12	SANDY CLAY			
5 FT		12	18.5	COAL	18.5	4	DRILLING
	S-3	0	12	SANDY CLAY			
5 FT		12	19	COAL	19 FT	4	DRILLING
	S-4	0	13	SANDY CLAY			
		13	17	COAL	17 FT	4	DRILLING
3 FT		17	19	VOID	17 FT	9 7/8	REAMING
	S-5	0	17.5	SANDY CLAY			
3 FT		17.5	21	VOID	17.5	9 7/8	DRILLING
	S-6	0	17.5	SANDY CLAY			
3 FT		17.5	21	COAL	21 FT	9 7/8	DRILLING
	S-7	0	14	SANDY CLAY			
N/A		14	21	COAL	21 FT	9 7/8	DRILLING
	S-8	0	11	CLAY			
		11	13	VOID	19 FT	4	DRILLING
5 FT		13	21	NO COAL, EASY DRILLING	11 FT	9 7/8	REAMING
	S-9	0	11	CLAY			
		11	11.5	VOID			
5 FT		11.5	20	NO COAL, EASY DRILLING	19.5	9 7/8	DRILLING
	S-10	0	11	SANDY			
		11	11.5	VOID			
5 FT		11.5	12	SOLID	11.5	9 7/8	DRILLING
	S-11	0	13	CLAY			
5 FT		13	20	COAL	20	4	DRILLING
	S-12	0	13.5	CLAY			
5 FT		13.5	20	COAL	20	4	DRILLING
	S-13	0	13.5	CLAY			
5 FT		13.5	20	COAL	20	4	DRILLING
	S-14	0	14	CLAY			
5 FT		14	20	COAL	20	4	DRILLING
	S-15	0	14	CLAY			
3 FT		14	20	COAL	20	4	DRILLING

ASHLAND HIGHWAY EMERGENCY PROJECT AMRB-90-01
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DRILLING SUMMARY FOR 3/21/1990
DATE

SPACING BETWEEN HOLES	DRILL HOLE NUMBER	FROM	TO	DESCRIPTION	DRILL HOLE FOOTAGE	BIT SIZE (IN.)	DRILLING OR REAMING
	S-16	0	13	CLAY, SANDY			
3 FT		13	20	COAL	20	4	DRILLING
	S-17	0	12	CLAY, SANDY			
3 FT		12	20	COAL	20	4	DRILLING
	S-18	0	12.5	SANDY, CLAY			
3 FT		12.5	20	COAL	20	4	DRILLING
	S-19	0	12.5	SANDY, CLAY			
5 FT		12.5	20	COAL	20	4	DRILLING
	S-20	0	12.5	SANDY, CLAY	12.5	9 7/8	REAMING
3 FT		12.5	13.5	VOID			
		13.5	14	COAL	13	4	DRILLING
	S-21	0	9	SANDY, CLAY			
		9	12	VOID			
3 FT		12	20	VERY LOOSE DRILLING	17	9 7/8	DRILLING
	S-22	0	7	SANDY, CLAY			
3 FT		7	9.5	VOID	7	9 7/8	DRILLING
	S-23	0	3.5	SANDY, CLAY			
5 FT		3.5	7.5	VOID	3.5	9 7/8	DRILLING
	S-24	0	3	SANDY, CLAY			
5 FT		3	7	VOID	3	9 7/8	DRILLING
	S-25	0	6	RIGHT ON THE EDGE OF THE VOID			
5 FT		6	8.5	VOID	6	9 7/8	DRILLING
	S-26	0	9.5	SANDY, CLAY			
5 FT		9.5	14.5	VOID	9.5	9 7/8	DRILLING
	S-27	0	12.5	SANDY, CLAY			
5 FT		12.5	20	COAL	20	9 7/8	DRILLING
	S-28	0	13	OB			
5 FT		13	20	COAL	20	4	DRILLING
	S-29	0	12.5	OB			
5 FT		12.5	20	COAL	20	4	DRILLING
	S-30	0	12	OB	12	4	DRILLING
3 FT		12	18	VOID	12	9 7/8	REAMING

ASHLAND HIGHWAY EMERGENCY PROJECT AMRB-90-01
ROSEBUD COUNTY, MONTANA

DRILLING SUMMARY FOR 3/21 & 3/26/90
DATE

SPACING BETWEEN HOLES	DRILL HOLE NUMBER	FROM	TO	DESCRIPTION	DRILL HOLE FOOTAGE	BIT SIZE (IN.)	DRILLING OR REAMING
	S-31	0	12	OB			
3 FT		12	15.5	VOID	12	9 7/8	DRILLING
	S-32	0	14	OB			
5 FT		14	20	COAL	20	9 7/8	DRILLING
	S-33	0	13.5	OB			
5 FT		13.5	20	COAL	20	4	DRILLING
	S-34	0	13.5	OB			
5 FT		13.5	20	COAL	20	4	DRILLING
	S-35	0	12	OB			
5 FT		12	15	VOID	17	4	DRILLING
		15	20	SOFT DRILLING	12	9 7/8	REAMING
	S-36	0	11.5	OB			
5 FT		11.5	14	VOID	11.5	9 7/8	DRILLING
DRILLED 3/26/90							
	S-37	0	13	SANDY, CLAY			
		13	15	VOID	18	4	DRILLING
5 FT		15	20	SOFT MATERIAL	13	9 7/8	REAMING
				WHEN REAMED, ROOF CAVED IN AT 10.5 FT			
	S-38	0	10.5	WEAK SS			
5 FT		10.5	14	VOID	10.5	9 7/8	DRILLING
	S-39	0	11	OB			
5 FT		11	12	VOID	11	9 7/8	DRILLING
	S-40	0	13.5	OB			
		13.5	19.5	COAL	20	9 7/8	DRILLING
5 FT		19.5	20	SHALE			
	S-41	0	14	SANDY			
5 FT		14	20	COAL	20	4	DRILLING
	S-42	0	8.5				
		8.5	9.5	VOID	20	4	DRILLING
		9.5	20	SOFT,LOOSE-NO CO	17	9 7/8	REAMING
	S-43	0	20	SAND	20	4	DRILLING
5 FT				NO COAL, NO REAL VOID			
	S-44	0	17	SAND, SS			
5 FT		17	20	GRAVEL, NO CO	20	4	DRILLING

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DRILLING SUMMARY FOR 3/26/1990
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SPACING BETWEEN HOLES	DRILL HOLE NUMBER	FROM	TO	DESCRIPTION	DRILL HOLE FOOTAGE	BIT SIZE (IN.)	DRILLING OR REAMING
	S-45	0	18	SAND, GRAVEL			
5 FT		18	20	VOID ???/NO CO	20	4	DRILLING
	S-46	0	20	SANDY GRAVEL	30	4	DRILLING
5 FT		20	30	2ND DRILL STEEL, SHALE GRAY			
	S-47	0	15	SANDY			
6.5 FT		15	20	GRAVEL	20	4	DRILLING
	S-48	0	10	SAND			
		10	12.5	VOID			
		12.5	16	SAND			
9.5 FT		16	20	HARDER DRILLING	17.5	4	DRILLING
	S-49	0	14.5	OB			
5 FT		14.5	20	COAL	20	4	DRILLING
	S-50	0	13.5	OB			
		13.5	19.5	COAL			
5 FT		19.5	20	SHALE	20	4	DRILLING
	S-51	0	13	OB			
		13	19.5	COAL			
5 FT		19.5	20	SHALE	20	4	DRILLING
	S-52	0	13	OB			
		13	19.5	COAL			
10 FT		19.5	20	SHALE	20	4	DRILLING
	S-53	0	13	OB			
		13	19.5	COAL			
10 FT		19.5	20	SHALE	20	4	DRILLING
	S-54	0	14				
		14	20	COAL	20	4	DRILLING
15 FT BACK FROM S-8	S-55	0	4	OB	10	4	DRILLING
		4	10	MUSHY SOFT	10	9 7/8	REAMING
5 FT							
	S-56	0	15	NO COAL			DRILLED 3/28
5 FT				SOFT FROM 6-11	15	9 7/8	DRILLING
	S-57	0	6	OB			DRILLED 3/28
		6	6.5	SMALL VOID			
		6.5	12	NO VOID, SOFT	11.5	9 7/8	DRILLING

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DRILLING SUMMARY FOR 3/26/1990
DATE

SPACING BETWEEN HOLES	DRILL HOLE NUMBER	FROM	TO	DESCRIPTION	DRILL HOLE FOOTAGE	BIT SIZE (IN.)	DRILLING OR REAMING
6 FT BELOW ROAD SURFACE	N-1	0	9	CLAY			
		9	11	COAL			
5 FT		11	20	SHALE, CLAY	20	4	DRILLING
	N-2	0	11	OB			
		11	12	COAL			
5 FT		12	20	SHALE, CLAY	20	4	DRILLING
	N-3	0	10	SAND, CLAY			
5 FT		10	20	SHALE	20	4	DRILLING
	N-4	0	20	SAND, CLAY			
5 FT				NO COAL	20	4	DRILLING
	N-5	0	12	SAND, CLAY			
5 FT		12	20	SHALE	20	4	DRILLING
	N-6	0	12	SAND, CLAY			
5 FT		12	20	SHALE	20	4	DRILLING
	N-7	0	12	SAND, CLAY			
5 FT		12	18	SHALE			
		18	20	CLAY	20	4	DRILLING
	N-8	0	12	SAND, CLAY			
		12	20	SHALE	20	4	DRILLING
5 FT				ALMOST LIKE VOID			
	N-9	0	13	OB			
		13	16	COAL			
5 FT		16	20	NO CUTINGS	20	4	DRILLING
	N-10	0	10	OB			
		10	15	COAL			
5 FT		15	20	SHALE	20	4	DRILLING
	N-11	0	9	OB			
		9	14	COAL			
5 FT		14	16	SHALE	16	4	DRILLING
	N-12	0	9	OB			
		9	14	COAL			
5 FT		14	16	SHALE	16	4	DRILLING
	N-13	0	8.5	OB			
		8.5	14.5	COAL			
5 FT		14.5	16	SHALE	16	4	DRILLING

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DATE

SPACING BETWEEN HOLES	DRILL HOLE NUMBER	FROM	TO	DESCRIPTION	DRILL HOLE FOOTAGE	BIT SIZE (IN.)	DRILLING OR REAMING
	N-14	0	8	OB			
		8	14.5	COAL			
5 FT		14.5	16	SHALE	16	4	DRILLING
	N-15	0	9	OB			
		9	15	COAL			
5 FT		15	16	SHALE	16	4	DRILLING
	N-16	0	9	OB			
		9	15	COAL			
5 FT		15	16	SHALE	16	4	DRILLING
	N-17	0	9	OB			
		9	15	COAL			
5 FT		15	16	SHALE	16	4	DRILLING
	N-18	0	9.5	OB			
		9.5	15.5	COAL			
5 FT		15.5	16	SHALE	16	4	DRILLING
	N-19	0	9.5	OB			
		9.5	15.5	COAL			
5 FT		15.5	16	SHALE	16	4	DRILLING
	N-20	0	9.5	OB			
		9.5	15	COAL			
5 FT		15	16	SHALE	16	4	DRILLING
	N-21	0	10	OB			
		10	16	COAL			
5 FT		16	17	SHALE	17	4	DRILLING
	N-22	0	10	OB			
		10	16.5	COAL			
23.5 FT		16.5	17	SHALE	17	4	DRILLING
	N-23	0	12	OB			
		12	17	COAL			
5 FT		17	18	SHALE	18	4	DRILLING
	N-24	0	12	OB			
		12	18.5	COAL			
5 FT		18.5	19	SHALE	19	4	DRILLING
	N-25	0	10	OB	10	4	DRILLING
3 FT		10	16	VOID	10	9 7/8	REAMING

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DRILLING SUMMARY FOR 3/26/1990
DATE

SPACING BETWEEN HOLES	DRILL HOLE NUMBER	FROM	TO	DESCRIPTION	DRILL HOLE FOOTAGE	BIT SIZE (IN.)	DRILLING OR REAMING
	N-26	0	9	OB			
		9	12	VOID	9	9 7/8	DRILLING
3 FT		12		ROCK AT 12 FT			
	N-27	0	9	OB			
10 FT		9	13	VOID	9	9 7/8	DRILLING
	N-28	0	9	OB			
5 FT		9	15	VOID	9	9 7/8	DRILLING
	N-29	0	7.5	OB			
5 FT		7.5	13.5	VOID	7.5	9 7/8	DRILLING
	N-30	0	8	OB			
5 FT		8	12	VOID	8	9 7/8	DRILLING
	N-31	0	8	OB	8	9 7/8	DRILLING
5 FT		8	11	VOID			
	N-32	0	11	OB			
5 FT		11	17.5	COAL	18	9 7/8	DRILLING
		17.5	18	SHALE			
	N-33	0	11	OB			
		11	16.5	COAL			
5 FT		16.5	17	SHALE	17	4	DRILLING
	N-34	0	10	OB			
		10	16	COAL			
5 FT		16	17	SHALE	17	4	DRILLING
	N-35	0	10	OB			
		10	16.5	COAL			
5 FT		16.5	17	SHALE	17	4	DRILLING
	N-36	0	10	OB			
		10	16.5	COAL			
5 FT		16.5	17	SHALE	17	4	DRILLING
	N-37	0	10	OB			
		10	16.5	COAL			
5 FT		16.5	17	SHALE	17	4	DRILLING
	N-38	0	10	OB			
		10	16.5	COAL			
5 FT		16.5	17	SHALE	17	4	DRILLING

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DRILLING SUMMARY FOR 3/27/1990
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SPACING BETWEEN HOLES	DRILL HOLE NUMBER	FROM	TO	DESCRIPTION	DRILL HOLE FOOTAGE	BIT SIZE (IN.)	DRILLING OR REAMING
	N-39	0	12	OB	DRILLED 3/28/90		
		12	12.5	COAL	12.5	4	DRILLING
	N-40	0	12	OB	DRILLED 3/28/90		
		12	12.5	COAL	12.5	4	DRILLING
	H-1	0	12	SS	12	4	DRILLING
10 FT		12	14	VOID			
	H-2	0	12	OB			
6 FT		12	14	VOID	12	4	DRILLING
	H-3	0	8	OB			
4.5 FT		8	10	VOID	8	4	DRILLING
	H-4	0	7.5	OB			
6.5 FT		7.5	9.5	VOID	7.5	4	DRILLING
	H-5	0	11	OB	15	4	DRILLING
11 FT		11	15	MAY BE VOID	15	9 7/8	REAMING
	H-6	0	12	NO VOID			
		12	14	COAL	14	4	DRILLING
	H-7	0	10	OB	10	4	DRILLING
5 FT		10	14	VOID	10	9 7/8	REAMING
	H-8	0	13	NO VOID			
17 FT		13	14	COAL	14	4	DRILLING
	H-9	0	14	SMALL VOID 13-14			
		14	15	SOLID	15	9 7/8	DRILLING
	H-10	0	10	OB			
10 FT		10	12	VOID	10	9 7/8	DRILLING
	H-11	0	10	OB			
8 FT		10	15.5	VOID	10	9 7/8	DRILLING
	H-12	0	11	OB			
20 FT		11	16.5	VOID	11	9 7/8	DRILLING
	H-13	0	11	OB			
7 FT		11	16.5	VOID	11	9 7/8	DRILLING
	H-14	0	12	OB			
2 FT		12	13	COAL	13	9 7/8	DRILLING

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DATE

SPACING BETWEEN HOLES	DRILL HOLE NUMBER	FROM	TO	DESCRIPTION	DRILL HOLE FOOTAGE	BIT SIZE (IN.)	DRILLING OR REAMING
	H-15	0	10	OB			
8 FT		10	15	VOID	10	9 7/8	DRILLING
	H-16	0	10	OB			
30 FT		10	16.5	VOID	10	9 7/8	DRILLING
	H-17	0	11.5	OB			
5 FT		11.5	14.5	VOID	11.5	9 7/8	DRILLING
	H-18	0	7	OB			
5 FT		7	10.5	VOID	7	9 7/8	DRILLING
	H-19	0	7	OB			
		7	11	VOID	7	9 7/8	DRILLING
	H-20	0	10	OB	10	4	DRILLING
		10	19	VOID	10	9 7/8	REAMING
	H-21	0	13	OB			
3.5 FT		13	14	COAL	14	4	DRILLING
	H-22	0	13	OB			
7 FT		13	14	COAL	14	4	DRILLING
	H-23	0	9	OB	9	4	DRILLING
8 FT		9	14	VOID	9	9 7/8	REAMING
	H-24	0	12	OB			
4 FT		12	15	COAL	15	9 7/8	DRILLING
	H-25	0	11	OB			
6 FT		11	13	COAL	13	9 7/8	DRILLING
	H-26	0	15	NO VOID, NO CO	15	9 7/8	DRILLING
6 FT	H-27	0	13	OB			
FROM H-24		13	14	COAL	14	4	DRILLING
5 FT	H-28	0	10	OB			
FROM H-23		10	16	VOID	10	4	DRILLING
5 FT							
	H-29	0	13	OB			
29 FT		13	14	COAL	14	4	DRILLING
	H-30	0	6	OB	6	4	DRILLING
5 FT		6	12	VOID			
		0	17	NO VOID DETECTED W/ 9 7/8" BIT	17	9 7/8	REAMING

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DRILLING SUMMARY FOR 3/27/1990
DATE

SPACING BETWEEN HOLES	DRILL HOLE NUMBER	FROM	TO	DESCRIPTION	DRILL HOLE FOOTAGE	BIT SIZE (IN.)	DRILLING OR REAMING
	H-31	0	14.5	OB			
		14.5	15	COAL	15	4	DRILLING
6 FT	H-32	0	14	OB			
FROM H-22		14	14.5	COAL	14.5	4	DRILLING
5 FT							
	H-33	0	14	OB			
5 FT		14	14.5	COAL	14.5	4	DRILLING
	H-34	0	13.5	OB			
5 FT		13.5	14	COAL	14	4	DRILLING
	H-35	0	13	OB			
5 FT		13	13.5	COAL	13.5	4	DRILLING
	H-36	0	13	OB			
37 FT		13	13.5	COAL	13.5	4	DRILLING
	H-37	0	9.5	OB			
5 FT		9.5	11.5	VOID	9.5	4	DRILLING
	H-38	0	8.5	OB			
5 FT		8.5	14	SOFT MUSHY	14	4	DRILLING
	H-39	0	10	OB			
5 FT		10	13	SOFT MUSHY	13	4	DRILLING
	H-40	0	5	OB			
5 FT		5	11	VOID	5	4	DRILLING
	H-41	0	13	OB			
5 FT		13	13.5	COAL	13.5	4	DRILLING
	H-42	0	13	OB			
		13	13.5	COAL	13.5	4	DRILLING
6 FT	H-43	0	13	OB			
FROM H-20		13	13.5	COAL	13.5	4	DRILLING
10 FT							
	H-44	0	11	OB			
15 FT		11	14	VOID	11	4	DRILLING
	H-45	0	13.5	OB			
5 FT		13.5	14	COAL	14	4	DRILLING
	H-46	0	13.5	OB			
10 FT		13.5	14	COAL	14	4	DRILLING

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SPACING BETWEEN HOLES	DRILL HOLE NUMBER	FROM	TO	DESCRIPTION	DRILL HOLE FOOTAGE	BIT SIZE (IN.)	DRILLING OR REAMING
	H-47	0	13	OB			
10 FT		13	13.5	COAL	13.5	4	DRILLING
	H-48	0	13	OB			
10 FT		13	13.5	COAL	13.5	4	DRILLING
	H-49	0	13	OB			
5 FT		13	13.5	COAL	13.5	4	DRILLING
	H-50	0	13	OB			
5 FT		13	13.5	COAL	13.5	4	DRILLING
	H-51	0	12.5	OB			
5 FT		12.5	13	COAL	13	4	DRILLING
	H-52	0	12.5	OB			
5 FT		12.5	13	COAL	13	4	DRILLING
	H-53	0	12.5	OB			
5 FT		12.5	13	COAL	13	4	DRILLING
	H-54	0	10	OB			
5 FT		10	14.5	VOID	10	4	DRILLING
	H-55	0	8	OB			
5 FT		8	17	VOID	8	4	DRILLING
	H-56	0	8	OB			
5 FT		8	12	VOID	8	4	DRILLING
	H-57	0	11	OB			
5 FT		11	15	MUSHY	15	4	DRILLING
	H-58	0	13	OB			
		13	13.5	COAL	13.5	4	DRILLING
	H-59	0	11.5	OB			
5 FT		11.5	12	COAL	12	4	DRILLING
	H-60	0	12	OB			
5 FT		12	12.5	COAL	12.5	4	DRILLING
	H-61	0	12	OB			
5 FT		12	12.5	COAL	12.5	4	DRILLING
	H-62	0	12	OB			
5 FT		12	12.5	COAL	12.5	4	DRILLING

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SPACING BETWEEN HOLES	DRILL HOLE NUMBER	FROM	TO	DESCRIPTION	DRILL HOLE FOOTAGE	BIT SIZE (IN.)	DRILLING OR REAMING
	H-63	0	12	OB			
10 FT		12	12.5	COAL	12.5	4	DRILLING
	H-64	0	12	OB			
		12	12.5	COAL	12.5	4	DRILLING
	H-65	0	16	OB			
10 FT		16	16.5	COAL	16.5	4	DRILLING
	H-66	0	15.5	OB			
		15.5	16	COAL	16	4	DRILLING
	H-67	0	14	OB			
5 FT		14	19	VOID	14	4	DRILLING
	H-68	0	13	OB			
		13	19	COAL			
5 FT		19	20	SHALE	20	4	DRILLING
	H-69	0	13.5	OB			
15 FT		13.5	14	COAL	14	4	DRILLING
	H-70	0	9	OB			
5 FT		9	14.5	VOID	9	4	DRILLING
	H-71	0	8.5	OB			
		8.5	12	VOID	8.5	4	DRILLING
	H-72	0	13	OB			
5 FT		13	13.5	COAL	13.5	4	DRILLING
	H-73	0	13.5	OB			
5 FT		13.5	14	COAL	14	4	DRILLING
	H-74	NOT DRILLED					
	H-75	0	11	OB			
5 FT		11	19	VOID	11	4	DRILLING
	H-76	0	7.5	OB			
5 FT		7.5	10	VOID	7.5	4	DRILLING
	H-77	0	5	OB			
5 FT		5	12.5	VOID	5	4	DRILLING
	H-78	0	6.5	OB			
5 FT		6.5	11	VOID	6.5	4	DRILLING

ASHLAND HIGHWAY EMERGENCY PROJECT AMRB-90-01
ROSEBUD COUNTY, MONTANA

DRILLING SUMMARY FOR 3/27/1990
DATE

SPACING BETWEEN HOLES	DRILL HOLE NUMBER	FROM	TO	DESCRIPTION	DRILL HOLE FOOTAGE	BIT SIZE (IN.)	DRILLING OR REAMING
	H-79	0	6.5	OB			
		6.5	10	VOID	6.5	4	DRILLING
	H-80	0	12	OB			
5 FT		12	20	MUSHY/SOFT NO CO	20	4	DRILLING
	H-81	0	5.5	OB			
5 FT		5.5	11	VOID	5.5	4	DRILLING
	H-82	0	4.5	OB			
		4.5	12	VOID	4.5	4	DRILLING
	H-83	0	13	OB			
		13	13.5	COAL	13.5	4	DRILLING
	H-84	0	13	OB			
6 FT		13	13.5	COAL	13.5	4	DRILLING
	H-85	0	13	OB			
5 FT		13	13.5	COAL	13.5	4	DRILLING
	H-86	0	12.5	OB			
		12.5	13	COAL	13	4	DRILLING
	H-87	0	11	OB			
5 FT		11	19	VOID	11	4	DRILLING
	H-88	0	14	OB			
5 FT		14	14.5	COAL	14.5	4	DRILLING
	H-89	0	13.5	OB			
5 FT		13.5	14	COAL	14	4	DRILLING
	H-90	0	13	OB			
5 FT		13	14	COAL	19	4	DRILLING
		14	19	SOFT MUSHY			
	H-91	0	7	DRILLING			
5 FT		7	10	VOID	12	4	DRILLING
		10	15	SOFT			
	H-92	0	7	OB			
5 FT		7	10	VOID	7	4	DRILLING
	H-93	0	7	OB			
5 FT		7	13	VOID	7	4	DRILLING

ASHLAND HIGHWAY EMERGENCY PROJECT AMRB-90-01
ROSEBUD COUNTY, MONTANA

DRILLING SUMMARY FOR 3/28/1990
DATE

SPACING BETWEEN HOLES	DRILL HOLE NUMBER	FROM	TO	DESCRIPTION	DRILL HOLE FOOTAGE	BIT SIZE (IN.)	DRILLING OR REAMING
	H-94	0	11	OB	DRILLED 3/27/90		
5 FT		11	19	VOID	11	4	DRILLING
	H-95	0	9	OB	DRILLED 3/27/90		
		9	16	VOID	9	4	DRILLING
	H-75	0	10.5	OB			
		10.5	14	VOID	10.5	9 7/8	REAMED
	H-77	0	15	SOFT, NO			
				APPARENT HOLE	15	9 7/8	REAMED
	H-78	0	13	SOFT, NO			
				APPARENT HOLE	13	9 7/8	REAMED
	H-80	0	11	OB			
		11	12	VOID	11	9 7/8	REAMED
	H-87	0	11	OB			
		11	13	VOID	11	9 7/8	REAMED
	H-91	0	13	OB			
		13	13.5	VOID	13	9 7/8	REAMED
	H-92	0	13	OB			
		13	13.5	VOID	13	9 7/8	REAMED
	H-94	0	11	OB			
		11	11.5	VOID	11	9 7/8	REAMED
5 FT	H-96	0	14	OB			
FROM H-95		14	14.5	VOID			
TO H-96		14.5	15	SOFT	14.5	9 7/8	DRILLING
	H-99	0	11	OB			
10 FT		11	14	VOID	11	9 7/8	DRILLING
	H-100	0	8	OB			
6 FT		8	12.5	VOID	8	9 7/8	DRILLING
	H-101	0	9	OB			
6 FT		9	14.5	VOID	9	9 7/8	DRILLING
	H-102	0	8	OB			
4 FT		8	13.5	VOID	8	9 7/8	DRILLING
4 FT	H-103	0	9	OB			
FROM H-101		9	14.5	VOID	9	9 7/8	DRILLING

ASHLAND HIGHWAY EMERGENCY PROJECT AMRB-90-01
ROSEBUD COUNTY, MONTANA

DRILLING SUMMARY FOR 3/28/1990
DATE

SPACING BETWEEN HOLES	DRILL HOLE NUMBER	FROM	TO	DESCRIPTION	DRILL HOLE FOOTAGE	BIT SIZE (IN.)	DRILLING OR REAMING
8 FT	H-104	0	8.5	OB			
FROM S-32		8.5	13.5	VOID	8.5	9 7/8	DRILLING
6 FT							
	H-105	0	8.5	OB			
4 FT		8.5	13	VOID	8.5	9 7/8	DRILLING
	H-106	0	11.5	OB			
5 FT		11.5	14	VOID	11.5	9 7/8	DRILLING
	H-107	0	11	OB			
9 FT		11	17	VOID	11	9 7/8	DRILLING
	H-108	0	12	OB			
6 FT		12	12.5	COAL	12.5	9 7/8	DRILLING
	H-109	0	13	OB			
11 FT		13	13.5	COAL	13.5	4	DRILLING
	H-110	0	8	OB			
		8	9	VOID	19	4	DRILLING
5.5 FT		9	20	SOFT/MUSHY, NO CUTTINGS			
	H-111	0	7	OB			
9.5 FT		7	20	SOFT/NO CUTTINGS	20	4	DRILLING
	H-112	0	13	OB			
		13	14.5	VOID	16.5	4	DRILLING
6.5 FT		14.5	18	SOFT			
	H-113	0	11	OB			
		11	12.5	VOID	13.5	4	DRILLING
11 FT		12.5	15	SOFT, MUSHY			
	H-114	0	7	OB			
		7	9	VOID	11	4	DRILLING
		9	13	SOFT			
		13	19	VOID			
		0	13	SOFT	19	9 7/8	REAMING
		13	19	SOME COAL, SOFT			
	H-37	0	11	OB	11.5	9 7/8	REAMING
		11	11.5	VOID			
		11.5	12	SOFT			
	H-40	0	8.5	OB	10	9 7/8	REAMING
		8.5	9.5	VOID			
		9.5	11	SOFT			